MARCH, 1957

American Engineer

IN THIS ISSUE . . .

● **Educating Our Talented Children**

By

H. G. RICKOVER,

Rear Admiral, United States Navy

Admiral Rickover

Plus U. of Wisconsin Sponsors Institute on Report Writing ● Management Looks At Patents ● The Most Successful National Engineers' Week Ever ● Full Report of Board of Director's Meeting at Charleston, S. C.

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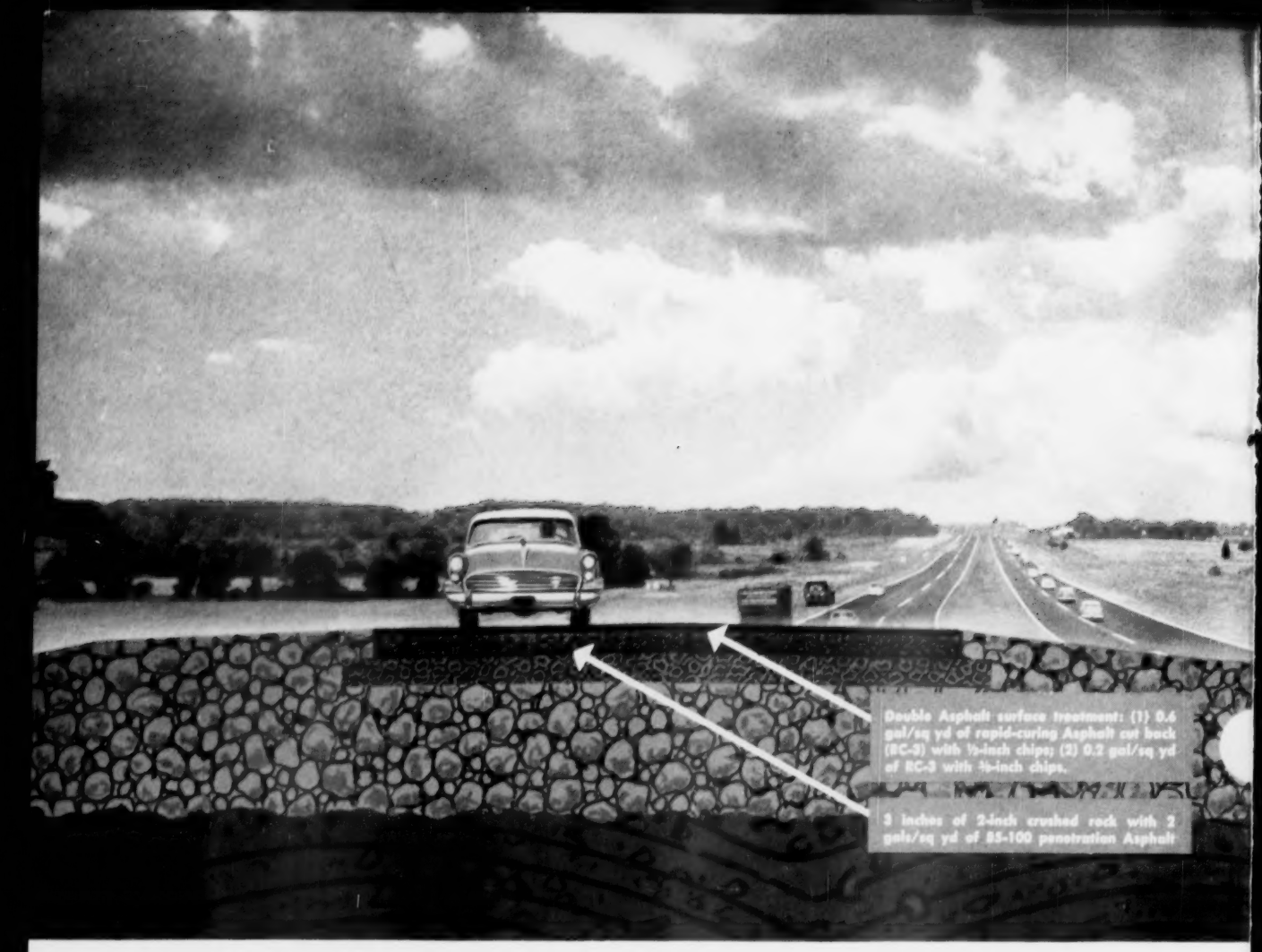

Double Asphalt surface treatment: (1) 0.6 gal/sq yd of rapid-curing Asphalt cut back (RC-3) with ½-inch chips; (2) 0.2 gal/sq yd of RC-3 with ⅜-inch chips.
3 inches of 2-inch crushed rock with 2 gals/sq yd of 85-100 penetration Asphalt

This ASPHALT superhighway costs New Hampshire

Since June 25, 1950, this New Hampshire Toll Road has been proof-in-operation of Asphalt pavement economy. Low in first cost. Low in maintenance cost.

ASPHALT construction saved $85,000 per mile in *first* costs, as well

Yes! This is the figure reported by New Hampshire authorities. $36.07. That's for maintaining pavement alone . . . all four lanes. The average cost per mile, per year during the first five years operation of New Hampshire's 14.7-mile Asphalt Turnpike . . . linking Asphalt Turnpikes of Maine and Massachusetts.

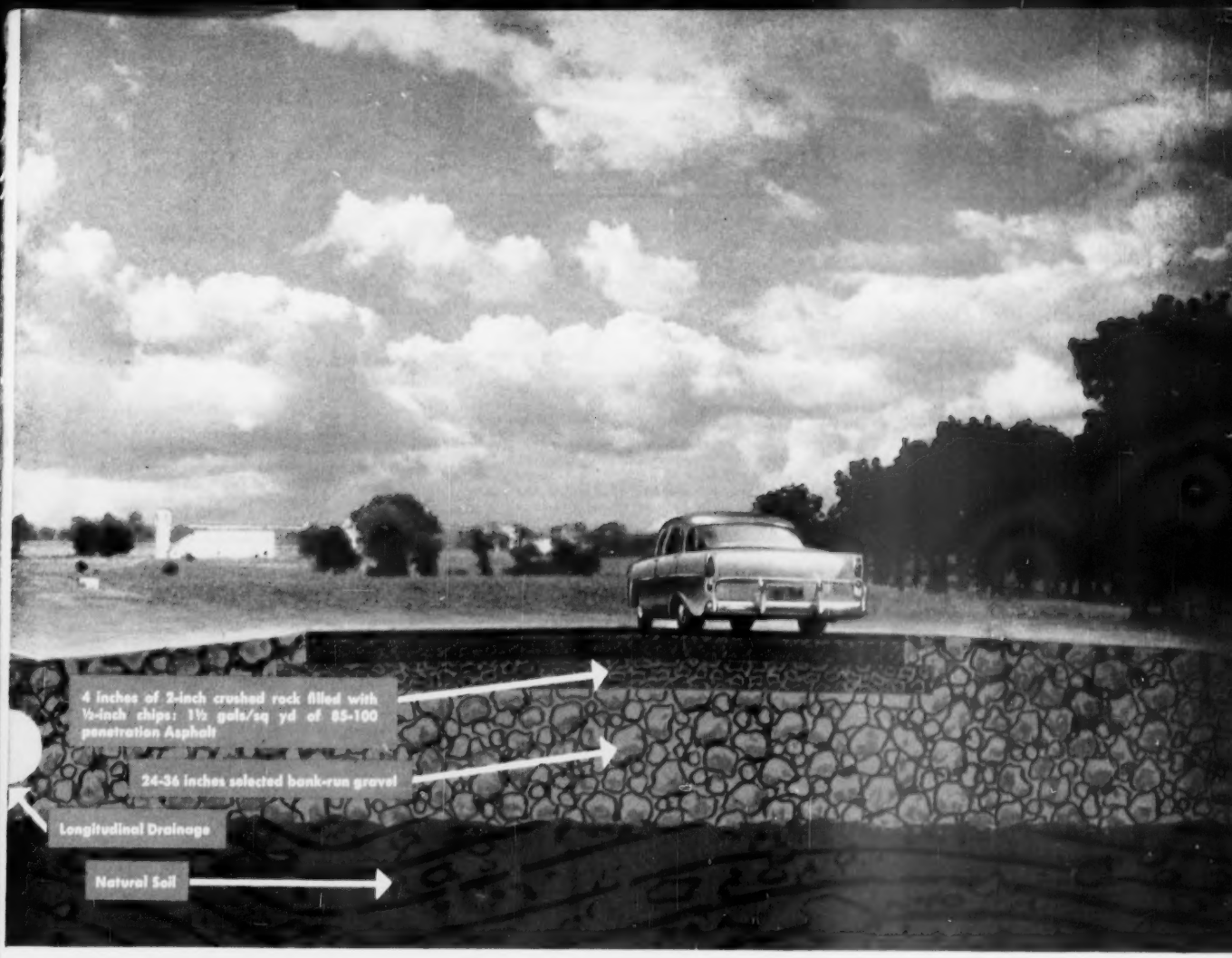
What's the five-year overall total? $2,651.06! Per year? $530.21! Per vehicle? (there were 14,520,723 of them) $.000175!

Can these be considered "yardstick" figures?

Yes! Other modern heavy-duty Asphalt pavements that carry heavy traffic and are in areas of severe weather variation have maintenance costs comparable to these. These maintenance figures seem remarkable . . . almost unbelievable . . . but such remarkable savings can be expected when heavy-duty rugged Asphalt pavements are properly engineered and constructed.

How was this low-maintenance pavement designed?

The section above shows basic construction . . . first a carefully selected sub-base, then two courses of Asphalt penetration


4 inches of 2-inch crushed rock filled with ½-inch chips; 1½ gals/sq yd of 85-100 penetration Asphalt
24-36 inches selected bank-run gravel
Longitudinal Drainage
Natural Soil

only $36.07 to maintain (per mile, per year)

macadam, topped with a double Asphalt surface treatment. Most sub-base material came from the right-of-way or adjacent borrow.

Bids for the Asphalt structure ran $85,000 per mile under next lowest bids for pavement of comparable specifications. Such a saving pays for many years of maintenance . . . not only of the pavement but of the entire right-of-way.

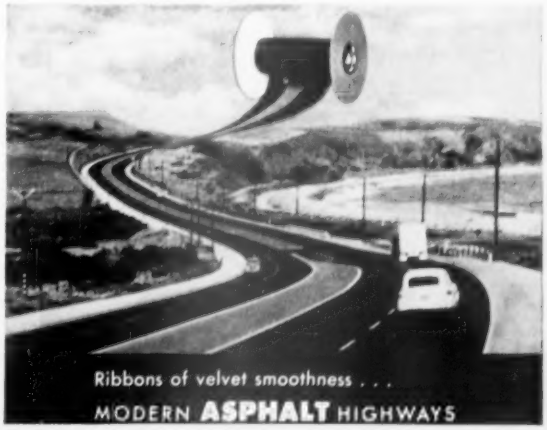
What about performance?

John O. Morton, New Hampshire Commissioner of Public Works and Highways, has this to say, "The pavement has shown performance during its first five years of use that leaves nothing to be desired."

For low costs, long life, high performance . . . for smooth, safe riding . . . design for Asphalt construction.

Safety is not a function of cost

Despite its low construction and maintenance costs, New Hampshire's Asphalt Turnpike has achieved one of the best safety records on major highways in the nation.



THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

(Circle 1 on Inside Back Cover)

Letters to the Editor

Non-Literary Engineers . . .

Dear Editor:

Your article "We're Fooling Ourselves about Russia" by ex-Senator Benton, was noted. As a Federal Government man, Senator Benton suggests more and bigger scholarships. But too many scholarships are as bad as too few.

The problem is very complicated and a lot of things will have to be done in order to conquer it. Some of them are hard to do and will take time. But perhaps we are fortunate in having the problem handed to us while there is yet time to solve it.

A scholarship is a device to permit a worthy man to get an education when he cannot afford to pay for it. Unfortunately, too many captains of industry do not consider themselves "top dog on the totem pole" if they cannot boast to their comrades that their sons are going through college on a scholarship. I personally know several of this type, therefore I contribute to no gift scholarships. There is too much "trading" on the subject.

What must be done is to inject salesmanship into the problem. A good salesman sells value, not price. People buy Cadillac cars, which are among the most expensive on the road because they think they are getting top value. The same is true of education. You sell the value of being a college graduate, not the cost of becoming one. Once your candidate is convinced that he needs a college degree, he will find the money to buy it.

We love standardization and so we have standardized on education and that is bad. Not everybody is alike. Some people think in terms of finance, others in terms of art, and some few think in terms of science. The tendency is born when we are young. But our education is based on the fallacy that everybody is a literary genius. That is so because, in order to be a teacher, you usually have to have an M.A. degree, which means that you are qualified in the classics. A scientist is usually not interested in anything except science, and when he fails to pass his literary courses, he gets disgusted and gets a job instead of going to college. And so you lose an engineer to compete with Russia. A scholarship is of no interest to him. He would not go to college if you paid him a salary. What you have to do is to appreciate his mentality and teach him science.

And so I have adopted a slogan: "Teach science to the scientists, and engineering to the engineers, and the classics to those who desire to become writers and editors and business men." And the propagation of this slogan has brought down on my head all the vituperation and abuse that the proponents of the classical education, whom I choose to call the "Intellectual Eggheads," have been able to devise. But it is a fact.

Before you go off at half-cock, carefully define your terms. The classics are not synonymous with the humanities. The classics are those subjects taught by the English public schools during the classical period when the British Empire was in the making — namely from William the Conqueror to Queen Victoria. The classics involve modern languages spoken at that time, which is as different from those spoken today as Latin is different from Italian. It involves literature of a selected few authors of the period, music of the period, art and architecture, as well as Latin and Ancient Greek and the literature of those languages. Thus Ancient Greek is a classical language but Sanskrit and Chinese are not. If you want to be an engineer, you have to pass the college board examination. In order to pass the college boards, you must be an authority on the classics. And that is why you are so short of engineers. And that is the only reason.

What are you going to do about it?

RALPH M. SHAW, JR.,
Beverly, N. J.

The U. S. And Russia . . .

Dear Editor:

Most certainly we will act on what Mr. Benton tells us in the January issue about Russia. Otherwise, we will go down the chute, period. . . .

But supposing by some miracle we escape the radiation death being cooked up for us by overloading our stratosphere with radioactive strontium (and other products), we will shortly be swamped (so far as numbers go) by world-wide technological competition trained and put out by Russia's "people's education system."

Mr. Benton is too shrewd a thinker not to see the point of this or to fail to state it. But perhaps it should have still more emphasis than he has given it here.

Obviously, the United States public will not stand for Russia's methods, involving, as they do, an outright overproduction of trained specialists, with the objective of dominating the planet. Over here we want the engineering and scientific talent that we need and not a vast surplus for "export," involving annexing the affairs of our neighbors. When that is all done, of course, those single-minded Russians will have not the slightest hesitation about putting the technical talent right back where they were promoted — from digging coal, etc. It might even let them live in preferred slums, if available.

Since, as Mr. Benton shows, we can never compete numerically with Russia in educating new talent, we must surpass Russia in (1) quality, and (2) training objectives.

This means our engineers for "export" must be sent among our neighbors to serve and not to subjugate as Russia's engineers will be trained to do.

There is little doubt that Nehru and Indonesia, not to mention the Middle East, will recognize the difference. They already show plenty of symptoms of being at least that smart.

If we scotch those fool hydrogen explosions and send out engineers to spread technology and know-how who are conspicuously free of all tags and labels identifying them with great corporations bent upon controlling world-markets — our future will be rosy.

HENRY D. HAMMOND, P.E.,
New York, N. Y.

Integrated Membership . . .

Dear Editor:

Mr. Dyer's article in the January issue suggesting "integrated membership" as a means of unity is a subject close to my heart. . . . Actually, (the term) "integrated membership" is a little confusing and not quite to the point when compulsory, simultaneous or mandatory membership is suggested as a requisite for continuing registration. "Drafting" is another term familiar to former G. I's.

I will go along with "mandatory membership" as being the most direct approach to

(Continued on page 7)

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MARCH

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—H. G. RICKOVER, Rear Admiral, U. S. Navy

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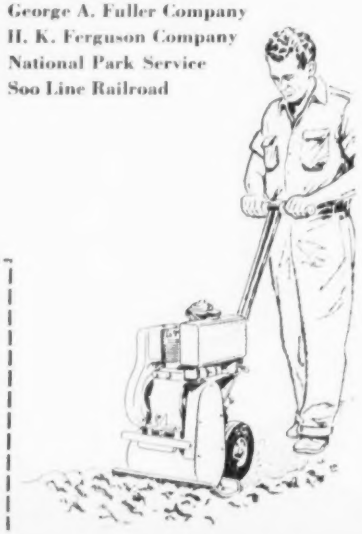

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Letters

(Continued from page 4)

unity and strength. Compulsory registration does not benefit the individual, the public nor the profession to nearly the extent as would registration plus unified engineering association. Legislation beyond registration is necessary if engineering is to become a powerful body capable of guarding individual interests and improving ethical and economic standards of the profession. But until engineering builds an association paralleling those of the medical and legal professions, we can not realize much effect from throwing our weight around.

Engineering societies, as such, are excellent, but engineering needs one all-encompassing association of every registered engineer. To make NSPE more acceptable as this "grass roots" organization, I would like to see its name changed to the American Engineering Association thereby setting it on a plane above and apart from other societies and social organizations. Then, at the state level, concerted effort could be made to write mandatory membership into our registration laws. I believe we would have the support of doctors, lawyers, architects, teachers and other professions if we take the initiative. These groups have been very successful with varying degrees of mandatory membership.

NSPE could lead the way.

KELLER WEAVER, P.E.,
Past Pres., Alabama ASPE,
Birmingham, Ala.

Texas Agrees . . .

Dear Editor:

The undersigned has just finished reading the article "The Society and Integrated Membership" in the January 1957 issue of the AMERICAN ENGINEER. We agree with your article wholeheartedly and are of the opinion that there are a number of other members of the Texas Society of Professional Engineers who also share these thoughts in this matter.

The undersigned has long been convinced that the engineering profession will reach a truly "professional" status when we begin to adopt and use some of the tried and tested plans of the other professions. The "integrated membership" plan is the one factor which should go a long way towards solving the Society's problem in connection with encouraging more registered engineers to become Society members, and should solve the Society's problem of proper professional policing of *all* registered engineers.

JACK W. HAYDEN, P.E.,
Houston, Tex.

Tomorrow's P.E.s . . .

Dear Editor:

After reading Edward Winterhalter's letter in the December issue, I should like to submit the following three ways in which engineers can work toward having more capable boys ready each year to enter science and mathematics courses in high school. These are in addition to the one indicated in "Among subjects at the Board Meeting," namely, having more good teachers of science and mathematics in the grade schools.

1. After considerable experience with boys of this age, I subscribe to McEathron's conclusion that "Boys, particularly, have this (the mechanical) type of mind." The mechanical type often cannot be taught to read easily and competently by the sight method, or largely by this system. Parents of boys who might be future scientists may well start giving attention to this at the primary level. Engineers who are interested that the earliest educational adventures of boys be successful, may see if some plan is being worked out in the local schools with this in mind. Dr. Samuel Orton recommended that (in rooms which use the sight method largely) boys who show that by the middle of first grade they are not going to be as successful as would be expected from their mental capacity, be given a thorough training in the Phonics method. Surely early success in the educational adventure, especially in reading, is important for the "cub" in the engineering field.

2. Young Engineer Clubs in the high schools, colleges, etc. are naturally the first steps that should be taken in this direction; however, it seems to me, that as soon as possible these ventures should be extended among the grade school age. In my tiny Astronomy Club, I have one first-grade boy. Surely we cannot discount this early interest and experience at elementary levels.

3. Besides being concerned with the securing of good teachers of mathematics and science in the grade schools, engineers might well be active in support of any plan which would capitalize on these qualifications in the local schools. Although in some places homogeneous grouping of some kind is being used, by and large in our country, I judge, teachers are faced with large heterogeneous classes. The broad range of ability in all subjects among children who are grouped only by age is an accepted fact. Here is a complicated problem in human engineering, which is dependent upon attitudes of administration and parents. In mathematics, especially, it has been my experience that grouping is almost an essential in large classes if the more capable are to be shielded from boredom and discouragement and allowed to proceed as rapidly as possible. In the "small Ohio school house sixty years ago" there was, perhaps in some ways, a better chance for the stimulus of a Kettering than in the crowded, heterogeneous classrooms of today!

MARY J. TARBOX,
Glen Ellyn, Ill.

January Cover . . .

Dear Editor:

I had to look twice at the cover of the January, 1957, issue of the AMERICAN ENGINEER, usually so respectable in form as well as excellent in content.

On this cover, the dove of peace and the Soviet hammer, sickle, and star were visible together at left center as if placed there by a Moscow layout man intent on promoting their phony "peace and coexistence."

Please accept my strong objections to having the symbols of the belligerent Soviet state associated with the usual symbol of civilized peace on the cover of an American engineering magazine, unless, of course, your art staff subscribes to the idea from Mr. Orwell's book that "war is peace."

HEINO JOGIS, EIT,
San Francisco, Calif.

MECHANICAL ENGINEERS

The Research and Development Laboratories of a large organic chemical company have immediate and permanent vacancies for graduate mechanical engineers or chemical engineers in the Plant Engineering Group. Responsible design experience in a petrochemical industry or refinery is desired but not essential.

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Radio Engineers Schedule Seventh Radio Institute

The Seventh Region Institute of Radio Engineers announce that their 1957 Regional Conference will be held in San Diego, Calif., April 24-26. This show, which will be the major Southern California electronics meeting of the year, is expected to attract over 5000 scientists and engineers.

An outstanding group of the nation's leading scientists are scheduled to present over fifty technical papers. The theme of the conference is "Electronics in Space."

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Gustav E. Zabel Wins $1000 Contest Prize

Gustav E. Zabel, supervisor of engineering, Newcomb-Detroit Co., Detroit, Mich., has won a $1000 first prize in a Product Analysis Contest.

To win, Mr. Zabel competed with nearly 12,000 design engineers in analyzing Fenwal Incorporated's new Series 541 temperature controller. He had to answer twenty-five questions regarding the controller's design and performance, and then analyze which of its performance features were most useful to his control requirements.

Mr. Zabel is an NSPE member.

Material Handling Training Conference

The fourth annual Material Handling Training conference, which has brought the newest developments in the field to engineers and executives from hundreds of companies in seven countries: the U. S., Canada, England, Switzerland, France, Mexico, and the Netherlands, is scheduled this year from June 16-29 at the Industrial Management Center, Lake Placid, N. Y.

"Can't you forget your engineering degree? I just want to know how much to trim it!"

Pa. College To Graduate Engineer Secretaries

A free pamphlet for engineers has been prepared by the Business Training College, Wood St. & Blvd. of the Allies, Pittsburgh 22, Pa., which details the *Engineering Secretarial Course* offered by the college. Inaugurated two years ago the college will graduate its first class this June.

The purpose of the training is to enable graduates to assist engineers who do not have time to concern themselves with details that could be handled by a secretary understanding the engineering language. Each student is required to research and write a thesis on some phase of engineering as a prerequisite for graduation.

Arthur W. Tews Named St. Paul Chief Engineer

Arthur W. Tews, assistant chief engineer for the City of St. Paul, Minn., for the past year and a half has been elevated to the position of chief engineer by Commissioner of Public Works Frank D. Marzitelli.

A member of the National Society, Mr. Tews has spent his entire professional life engineering highways and streets. He was employed by the Minnesota Highway Department from 1924 to 1945. In 1945 he left the employ of the State to become city engineer of Duluth, which position he held until 1955 when he moved to St. Paul to become assistant chief engineer.

Mr. Tews is the immediate past president of the Minnesota SPE.

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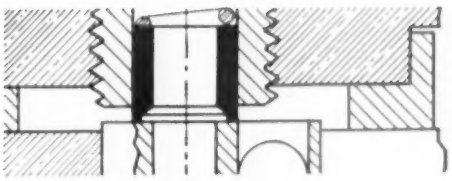
(Circle 9 on Inside Back Cover)

"Engineering Geography" At George Washington U.

A unique course, "Engineering Geography," is currently being offered in the School of Engineering of The George Washington University, Washington, D. C., as a part of its graduate course for the degree of Master of Engineering Administration.

The intent in originating this course was not to develop still another branch of geography, but to meet a real educational requirement, according to the dean of the School of Engineering, Dr. Martin A. Mason.

He said, "the need is to establish consciousness that decision making in engineering problems involves the physical, political, economic, and social characteristics of a region as much as the technical characteristics of the situation."



CAA Lists Engineer Jobs At Various U. S. Locations

Pacing the entry of civil aviation into the jet age is a vastly expanded program of the Civil Aeronautics Administration.

This Government agency is responsible for building, operating, and maintaining the airways system over which both civil and military planes navigate. It has a $75,000,000 program this year for new facilities such as radar to provide more efficient traffic control, and the President's budget message asked Congress to appropriate double this amount for 1957-58.

The CAA also conducts the $63,000,000 a year Federal Aid Airport Program, under which communities are being helped to modernize their airports.

A third aspect of CAA's jet age program is its work with aircraft manufacturers in approving the airworthiness of new types, such as the Boeing 707, Douglas DC-8, and Lockheed Electra.

For these activities, CAA has interesting openings for many more engineers at a variety of locations throughout the United States. Aeronautical, civil, electrical, electronic, and mechanical engineers may send applications or write to the Civil Aeronautics Administration Personnel Office, Washington 25, D. C., identifying their choice in location. Starting salaries range up to $7570 a year.

MECHANICAL ENGINEERS

Continually expanding programs at Northrop Aircraft are creating new opportunities for mechanical engineers in the following areas: launching and landing gear design, hydraulics and pneumatics, control systems, and equipment.

You'll enjoy the fine spirit of cooperation at Northrop. The new multi-million-dollar engineering and science center, now nearing completion, will be a great place to work in, both as to its modern architectural design and newest scientific installations. You'll be associated with a top engineering team on such notable projects as Northrop's new supersonic trainer airplane, Snark SM-62 intercontinental missile, and other advanced aircraft and missile programs.

You'll be given constantly fresh, challenging assignments. Remuneration will be substantial, with many benefits that are unexcelled in the entire industry—health and life insurance, college educational reimbursement plan, regular vacations plus extra year-end vacations with pay, and a generous retirement plan.

At Northrop, the progress of personnel is important. Initiative and ability are recognized and encouraged, and full opportunity is given to present and discuss ideas.

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(Circle 10 on Inside Back Cover)

Good Science Teachers Key To Manpower Supply

Good high school science teachers are the key to the science manpower supply, according to a recent survey among some of the nation's leading educators made by Teachers College, Columbia University.

Results of the survey of high school science study trends has been announced by Prof. F. L. Fitzpatrick, director of the Teachers College Science Manpower Project. How many students our schools will send on to America's factories, laboratories, and drawing boards is decided by whether the high school teachers are interesting or dull in the opinion of those surveyed, Dr. Fitzpatrick reports.

"An almost absolute relationship between good teaching and rising science enrollments was reported in the survey," the director said. "Wherever growing interest and enrollment in physics, chemistry, and mathematics was found, the principal reason was the influence and attraction of the science teacher or teachers.

"On the other hand, in one out of three communities reporting decline in science enrollments, the teacher was named as the number one factor," he added. "Here the teacher was labeled as being 'poorly prepared in the subject,' 'uninspired' or 'uninteresting.'"

The survey of 1000 Teachers College alumni went to a selected group of superintendents, principals, school supervisors, guidance directors, and science teachers.

ASTE To Broadcast During Silver Anniversary Meet

In commemoration of its Silver Anniversary, the American Society of Tool Engineers has announced plans for an hour-long closed circuit audio broadcast.

The broadcast will emanate from Houston, Texas, on the evening of March 25 as a part of the anniversary banquet program, and will be fed simultaneously to 143 ASTE chapters in as many cities across the nation and in Canada. The event will highlight the week-long twenty-fifth annual ASTE conference and anniversary celebration beginning March 23 at the Shamrock-Hilton Hotel in Houston.

Intensive Courses In Automatic Control

The University of Michigan, College of Engineering, has announced two summer Intensive Courses in Automatic Control. The first is scheduled for June 17 to 22 inclusive, and the second for June 24 to 26, 1957, inclusive. The courses are intended for engineers who find it necessary or who wish to obtain a basic understanding of the field, but who cannot spare more than a few days for this purpose. The aim of the courses is to make it easier to learn by a coherent presentation of the fundamentals of modern automatic control and by providing a comprehensive set of notes to serve as a framework for further study.

The courses are built around the principles and application of measurement, communication and control. Course I will consist of the fundamentals in each of these fields and will include some basic work in nonlinear systems. Course II will take up applications of the fundamentals to more advanced problems. There will be four hours of lecture each morning and three hours laboratory of demonstration in the afternoon. Extensive use will be made of computing, instrumentation and servo laboratories on the campus. The role of analog computing methods will be emphasized. These courses have been given previously in the summers of 1953, 1954, and 1955.

April 15 is the closing date for registration. Further information may be obtained by writing to Professor L. L. Rauch, Room 1521, East Engineering Building, University of Michigan, Ann Arbor, Mich.

MARCH MEETINGS OF NOTE

American Institute of Chemical Engineers—National Meeting, March 3-6, Greenbrier Hotel, White Sulphur Springs, Va.

American Railway Engineering Association—Annual Meeting, March 4-6, Sheraton-Jefferson Hotel, St. Louis, Mo.

Association of Iron and Steel Engineers—Western Meeting, March 4-6, St. Francis Hotel, San Francisco, Calif.

1957 Nuclear Congress—National Meeting, March 11-16, Convention Hall, Philadelphia, Pa.

Society of Women Engineers—Annual Meeting, March 15-17, Houston, Texas.

Institute of Radio Engineers—National Meeting, March 18-21, Waldorf-Astoria Hotel and the Coliseum, New York, N.Y.

Municipal and Sanitary Engineering Conference—Tenth Anniversary Conference, March 19-20, University of Florida, Gainesville, Fla.

American Society of Tool Engineers—Silver Anniversary Meeting, March 23-27, Shamrock Hilton Hotel, Houston, Texas.

Michigan SPE, Labor and Industrial Relations Center, Michigan State University, and College of Engineering, MSU—Conference on "Effective Utilization of Engineering Personnel," March 29-30, Kellog Center, MSU East Lansing, Mich.

Engineering Personnel Subject Of Conference

Ways to better utilize engineering personnel will be considered at a Michigan State University conference, March 29-30.

Purposes of the conference are to define problems in the utilization of engineering personnel and describe experiences with various solutions, to present the latest research findings by experts in this area, and to provide an interchange of ideas between personnel executives, engineering administrators, and university faculties.

Anyone interested in personnel problems as related to engineering, scientific, and technical personnel may attend.

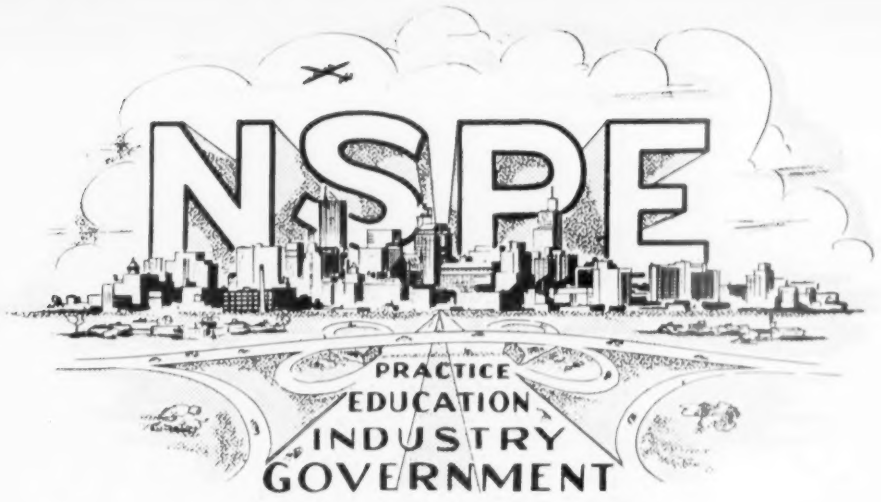
Prominent engineers and business executives who will participate in the program include Paul H. Robbins, NSPE executive director; Alfred Issles, president of Babcock and Wilcox Manufacturing Company, New York; William Caples, vice president of Inland Steel Company, Chicago; Gavin Pitt, director of personnel services, General Dynamics Corporation, New York; George Ordione, director of personnel division, American Management Association, and Dean John Ryder of the MSU College of Engineering.

Potter Elected Fellow In IRE

James L. Potter, professor of electrical engineering at Rutgers University, has been elected a Fellow in the Institute of Radio Engineers at a meeting of the Institute's Board of Directors. The new honor to Professor Potter was accompanied by a citation reading: "For contributions as an engineer and educator." The award will be noted at the Institute's annual banquet March 10. Professor Potter, an NSPE member, is chairman this year of the Princeton Section of the I.R.E.

Standards Engineers Society Elects Arlt

Herbert G. Arlt, Bell Telephone Laboratories, Murray Hill, N. J., has been elected president by the Standards Engineers Society for 1957, with Franklin E. Powell, Standards Branch, deputy chief of staff (Logistics), Department of the Army, as vice president.



INTERESTING FACTS

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Previous conventions have averaged well over 1000 attendance, however, plans and accommodations for this Dallas meeting anticipate attendance of 1500. Emphasis will be given to the young Engineers. Educational exhibits will be featured, and we expect approximately 400 senior engineering students from Southwestern colleges.

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(Circle 11 on Inside Back Cover)

American Engineer

The Magazine of the Registered Professional Engineer

VOLUME TWENTY-SEVEN NUMBER THREE

Educating Our Talented Children

By

H. G. RICKOVER,

Rear Admiral, United States Navy

As of today, the American people seem to feel that education is worth no more to them than about half of what they are paying for recreation, that is, about four per cent of the national income.

The more complex a society becomes, the larger proportionately is the number of intelligent, highly trained men needed for its proper functioning. They are the men who provide leadership in government, industry and labor; the men who think creatively, who invent, who push the boundaries of knowledge outward; the men who enrich life through their moral leadership or artistic gifts—all of the competent people who manage our complex technological civilization. They are all indispensable to our society. We must keep their ranks replenished by the inflow of properly trained youth of superior mental ability if we are to progress in the future as we have in the past.

Who then are these talented youth, and what provisions are we making for their intellectual training?

There is no general agreement on the definition of the term "talented." Sometimes it is applied to only the top one-and-one-half to two per cent of our children—those with an I.Q. of 135 and above. At other times it is given wider application to take in all who are above the average of high school graduates, i.e., 110 I.Q. and over.

A few figures may help to give perspective. The average intelligence of the total population has been arbitrarily set at 100 on this basis, those who enter high school average 105; those who graduate from high school 110; those who enter college 115; and college graduates 120. Generalized classifications such as these tend to be arbitrary, and I.Q. tests are not infallible. Moreover, they leave out of consideration differences in character and in will power.

However, for a rough approximation of the percentage of children with sufficient mental capacity to absorb training for a professional career let us take the figure of 15-20 per cent; which includes those having an I.Q. of

U. S. Bureau of Reclamation engineers conduct important research studies in hydraulics. The author points out that America's "way of life" is largely dependent upon the work of a small group of professionals.

115 and over. Very little is done in our schools to seek out and identify this top 15-20 per cent of our children. With few exceptions they are being taught along with the eighty per cent of average and below average mentality. Up to age twelve, the curriculum for all children is the same. In junior and senior high schools a basic core of the curriculum remains obligatory for all, and this is taught in classes which are attended by the whole range from below average to brilliant children.

As is often the case, where there is community pressure not to fail the poor student, advancement into the next higher grade becomes virtually automatic. This tends to convince the slow learners and lazy pupils that they can get by without working. Talented children may well resent having to work harder for no tangible reward. All children need incentives to keep up the learning process.

In addition to the common core of obligatory courses, our high schools offer a wide choice of elective subjects from which each child may pick those he prefers. Among the electives there are the tough academic subjects which constitute the college preparatory programs — mathematics, algebra, geometry, trigonometry, physics, chemistry, biology, foreign languages; there are the vocational subjects which make much less demand on the intellect or will power since little homework is required —domestic sciences for the girls and various trade skills for the boys; finally there are the subjects of a recreational nature—square dancing comes to mind—or those which in a vague sort of way aim to train children in cooperative and mutually helpful living—courses in social manners, life adjustment, the art of make-up, and how to attract the opposite sex.

All except the academic subjects are of the kind which we might term "know-how." That is, they have nothing to do with the school's primary task which is to teach young minds to think and to train them in the elementary tools of learning. This is a task which can be performed only by the school. Vocational, recreational, or life-adjustment training can be and should be obtained elsewhere.

This may sound strange to us, accustomed as we are to the intermingling in our schools of academic and vocational training, and to the great emphasis given to social activities. But we are the only country where schools are part social institutions; everywhere else children receive academic training in general schools, and vocational training in special vocational schools or through on-the-job training programs combined with general education at special secondary schools. Nowhere else in the world are curricula in secondary schools so largely elective as in America. Very few children have so earnest a love of learning—such intellectual fortitude as to pass up the chance to coast through school on the easy subjects.

It is the children from the better homes where entrance into college is taken for granted who take the college preparatory course at high school. But the talented children who come from poor homes often lack the parental example and urging to take this more difficult course. Classes are too large and teachers too burdened with extraneous responsibilities heaped upon them by the community to have time for the kind of counseling which discovers the talented children from poor homes and encourages them to take the tougher courses.

It is true that of late the needs of our talented children have won some recognition. Not yet won is the mass support necessary to bring about truly effective measures by legislative bodies, from which must come the necessary regulations and financial contributions to upgrade the schools of talented youth. More important, American public thinking has not yet connected shortages of trained manpower with inadequate provision for the proper education of the talented. Nor are we sufficiently aware that, in the final analysis, our cherished American standard of living is largely dependent on the work of a very small group of skilled professionals.

In part, this is a consequence of a curious inconsistency in our attitude towards "science" as against "scientists" and "scholars." We admire "science" greatly and we place in it an almost childlike trust; we expect it will continuously pour out delightful wonders to make our lives ever more agreeable. But upon "scientists" and "scholars" many of us look with a somewhat jaundiced eye; we call them "eggheads" and "intellectuals;" we do not consider them to be entirely normal persons. In truth, we have no real admiration for higher learning as such, nor are we willing to respect those engaged in it unless we see an immediate practical advantage to ourselves in their work.

Although not all talented children are academically inclined, enough of them do so well at institutions of higher learning that the spending of public funds for the better of education of all talented youth is an exceedingly good investment for the nation as a whole, and would do much to relieve our national deficit in trained professionals.

It is well to remember that the transformation of the traditionally academic American high school into a combination college preparatory, vocational, and social institution came about in response to the demand for schooling of a type more appropriate to the majority of chil-

dren—those who could not or did not want to take academic courses but whose parents nevertheless wished them to attend high school. As non-academic, know-how subjects wormed themselves into the curriculum, the high school became less and less able to give proper attention to the special educational needs of the minority of children whose superior intellect could find no challenge in down-graded curricula.

As a matter of fact, I seriously question whether substitution of know-how subjects for academic subjects benefits even those children who do not intend to follow academic careers. A great deal of this high school training in "know-how" is wasted because obsolete methods, equipment, and instruction are used. Such training is primarily the job of industry and can be done much better and in considerably less time in a factory than in a high school. Education is not a process for transmitting techniques.

Today every citizens needs the tools of thinking—the three R's—reading, writing, and arithmetic—and such general knowledge of history, civics, and literature as will make the world we live in understandable. In our technical civilization, manual and white collar workers, tradesmen and merchants—in short, everyone needs as much general education as he can possibly be coaxed to absorb. It isn't doing our children any favor to spare them all mental effort by making school too easy and too pleasant, and to substitute "know-how" subjects of doubtful value for mental training.

Eliminating "know-how" subjects from the high school curriculum and requiring all students to take more academic ones does not solve the problem of our talented children. It is high time that we recognize their right—even if they are a minority—to schooling appropriate to their needs. For the last fifty years we have, in the name of educational democracy, tried to make one common school serve all children instead of finding the appropriate school for the two main groups of children—the majority who plan on non-academic careers, and the minority who plan for college and university. We must reverse this unfortunate trend in American education.

It was Socrates who said that "knowledge is virtue." Though there have been regrettable lapses, Western civilization has never completely lost sight of this truism. The Greeks, alone of all the nations of the ancient world, placed knowledge and the power of thought above all other pursuits as being most worthy of a civilized man and a civilized state. We are indebted to them for that marvelous pedagogical invention—the liberal arts curriculum—which has never been surpassed for training the young to think, to use their brains in solving particular problems, and for providing a broad basis of general knowledge upon which specialized training could later safely be superimposed. We are rediscovering that a professional man needs the foundation of a liberal arts education in order to use his specialized training wisely. The man who is highly trained in only one field of knowledge and illiterate in all others can be a positive danger to society.

Allowing for the limits set by Marxist dogma, Russian schools resemble those of Europe. This, in part, explains why they are producing more men and women of professional caliber than we do. Since the government is all-powerful, it can exert more pressure on children to spur them on to maximum efforts than is possible in democratic countries; teacher shortages can be overcome by ordering people into the teaching profession regardless of their wishes; building materials can be diverted from housing desired by the people to buildings deemed more useful to the state—such as schools, laboratories, libraries, universities.

What concerns me most about the Russian school program is not the coercive element which speeds totalitarian programs, but the solid evidence that Russia has found a way to inspire in her children the desire to put forth their utmost mental efforts; and that she has done this through what we think of as "capitalist" incentives. A Russian child works hard and examinations are tough. But ahead looms a professional career which is highly attractive, combining excellent salary with much honor, prestige and respect. Children are imbued with a love of intellectual adventure through books in which the hero is a scientist or engineer who does valiant deeds that will benefit the country—not, as in so many of our books, and even more on radio and television, a cowboy or space cadet.

A hundred years ago, Americans could be proud that we were the first country in the world to promote free secondary school education for all children. However, today free secondary school education has been achieved or is well on the way to being achieved in all of Europe. But where we have lowered our secondary school curriculum to accommodate all children, Europe has maintained the high standing of its academic secondary schools and has provided special secondary vocational and trade schools for those unable to absorb academic training.

When the great inflow into our high schools began after the first World War, some eighty per cent of the students were found incapable of absorbing the academic subjects being taught. Community pressure and political expediency forced the schools to downgrade the curriculum. Now that the great inflow into the colleges is about to begin, something similar may well happen there.

But even worse than wasting expensive schooling on children who are neither able nor want to absorb it, is the damage done to our talented youth who are forced to waste two or three important years of their lives in omnibus schools unless their parents are rich enough to send them to private college preparatory schools. We

The writer is concerned that we have lowered our secondary school curriculum to accommodate *all* children. But what of the gifted?

—Photo by Bakelite

Illinois Tech student, Jack Kiser, takes part in a binaural hearing experiment at the Parmly Foundation for Auditory Research. The author says the length of professional education is a significant element in the trained manpower deficit.

shall not do justice to our talented youth until we seek them out at an early age—no later than ten or eleven—and educate them separately from the rest of the children. This need not necessarily be in a separate school; it could be in a college preparatory section of the school. But this separate schooling must begin earlier than junior high school. It should start after the fourth grade or, at the latest, the fifth grade.

We need to set ourselves the goal of making it possible for all children who have the will and the capacity to complete their general education in fourteen years, or by the time they are twenty. Fourteen years is a long enough time to provide a good liberal arts grounding. Professional postgraduate study ought not to begin later than the age of twenty, and brilliant children should be permitted to begin a year or so sooner.

The undue length of professional education in America is a significant element in our trained manpower deficit. Today, the American professional man will complete his education when he is between twenty-five and twenty-six, and for most there will have to be added two additional years of military service before they can become self-supporting.

I am aware that any change in the American public school system will meet opposition. Special schooling for the mentally superior will be branded as "undemocratic" and as "class" education. It will be considered "unfair" to give the talented child education superior to that offered the average. It will be said that the separation of children according to mental capacity will deny them valuable experience in living together with other children of varied background and ability, and that this constitutes an important ingredient in the smooth functioning of American democracy—so it will be said. None of these objections, however, bear critical examination.

It would, indeed, be "undemocratic" to propose a cleavage along class lines, but not one along the lines of natural ability, which hardly anyone will claim is limited to the children coming from better homes. It is, however, often forgotten that we already have just such a separation along class lines in large American cities where schools draw their pupils from a particular neighborhood rather than from the whole population, as is the case in smaller towns. Education is not a commodity such as a house, a television set, or an automobile. Everyone can use and enjoy a house, a TV set, or a car; it would indeed be "unfair" if the state distributed these commodities free of charge but limited them to only part of the population. The ability to use and enjoy academic training, on the other hand, is not universal; therefore, to limit it to those who can benefit from it is not unfair; but, to deny it to the minority who can use and derive benefit from academic training is both unfair and undemocratic, as well as a waste of our most valuable national asset.

In connection with my work in atomic power, I have interviewed more than 1,000 young college graduates. These interviews have made it plain to me that our educational system needs considerable improvement. It has, therefore, been a great disappointment to me that, despite the vast amount that has been said about it in recent years, so little is being done. We must, somehow, make a start. We cannot keep on just talking while our ruthless opponent acts.

I suggest that industry, together with our educational foundations undertake the setting up of model academic secondary schools in perhaps twenty-five different centers in the United States. These schools would be on a par with our best academic secondary schools. They would be free; the ability to pass an entrance examination of a kind which would weed out those not mentally capable of absorbing an academic secondary education would be the only requirement. The schools would be staffed by teachers truly capable of teaching talented children; teachers whose qualifications place less emphasis on training in teaching methods and more on graduate study in their fields. The competence of European secondary school teachers, based as it is on years of postgraduate study in their fields, is one of the main reasons why they can teach as much in twelve years as ours do in fourteen or fifteen.

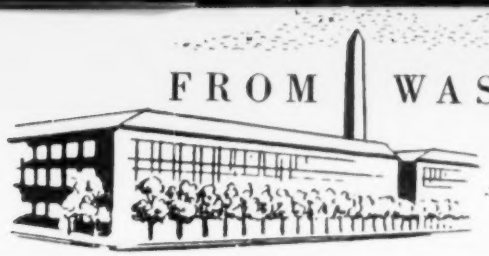
Teachers' salaries in these schools would be in accord with the high scholastic qualifications required and, therefore, equal to those paid for comparable positions in industry. Such salaries would attract competent teachers.

The schools would start with the fifth grade so as to have the pupils ready for college at sixteen. To do this, it may be necessary to provide a choice: students could complete the course the regular way in seven years, or they could finish in six years by taking extra courses during three summers. We must find a way for our children to attend school for more than the present 180 days. Lengthening the time in school might most easily be done through the medium of voluntary summer courses.

Teachers in these schools would be given no extracurricular work of any kind, because a teacher, as does any professional person, requires time for thought and study. The schools would be scholastic institutions, so social activities would be kept at a minimum.

I estimate that the cost of operating each model school for a period of five years will be about ten million dollars. At the end of that period the community ought to have an option to take over the school, provided it agrees

(*Continued on page* 49)



FROM WASHINGTON

By
Milton F. Lunch,
N.S.P.E.'s Legislative Analyst

DEFENSE COMMITTEE PROPOSALS ON ENGINEERS & TECHNICIANS DRAWS FIRE

FOR a report that hasn't been released, the so-called Cordiner Report has stirred up considerable interest and lengthy analyses in the public press, together with some congressional complaints about the way it came to public attention and some of the recommendations it contains. The study group derives its name from Ralph J. Cordiner, president of General Electric, who heads the Defense Advisory Committee on Professional and Technical Compensation, appointed last May to examine the military pay system and make recommendations for improving it.

Some members of Congress have complained that they are unable to secure copies of the report to answer inquiries from their constituents. It appears that the report was circulated to ranking members of the Senate and House Armed Services committees only, but inadvertently a copy fell into the hands of one service paper. In any event, the report has been widely quoted, in part, and some of the purported recommendations promise to bring forth considerable debate.

The basic problem which the report deals with is the impact of the technological revolution on defense weapons and equipment in terms of military personnel. The point is made that re-enlistments among technical enlisted personnel now run about ten per cent, while the re-enlistment rate of so-called "soft skills" (truck drivers, cooks, etc.) is twice that percentage. The Air Force estimates that in 1955 it lost men it trained for the "hard skills" at a cost of $2 billion. The Army and Navy make the same point. All of the services say they are unable to meet competition from industry in the engineering and electronics fields.

To rectify this situation, the Cordiner report proposes a radical change in military compensation thinking—pay by skill instead of by length of service. Under the present pay system a truck driver and an electronics technician who have equal time in grade draw the same pay. Instead, says the Cordiner group, they should be paid according to their "contribution" to the service and according to their "productivity." Under the plan, as reported, all enlisted men would get the same pay in grade up to the rank of corporal and equivalent rank in the Navy and Air Force. Thereafter, pay scales would favor the more technical skills. Within grade there would be pay increases based on performance, with the rewards highest in those skills requiring the longest training.

The Budget Bureau is said to be opposed to this method of military pay because initially it will add to defense costs. But the sponsors of the plan say that in a few years the plan will substantially lower the defense budget through savings on training programs. The committee has been quoted as saying "the present system puts too much emphasis upon survival on the job and, in fact, encourages mediocrity. The committee firmly believes that the antiquated longevity pay system is the primary basic cause of poor personnel retention today and considers it a Methuselah method of compensation in which there are periodic rewards for merely staying alive and out of trouble." The suggested proficiency advances would be authorized only for a relatively small percentage, probably not more than 15 per cent of the total enlisted strength.

For officers, the Cordiner group suggests an immediate pay increase, weighted heavily in favor of the senior grades in order to put the emphasis on advancement. It is basically wrong, the report states, that 5,500 lieutenant colonels now make more than 3,500 colonels, and that 4,500 majors make more than 13,000 lieutenant colonels —simply because of length of service and regardless of capabilities. Under the plan there would be sharp cut-off points beyond which there would be no further pay increases for length of service. Now, the committee says, only one out of four junior officers stays in the service

(Please turn the page)

after the obligatory three-year period. Very often the best men leave, it was stated, because they can do better in private industry.

Two of the most influential members of the Senate—Senator Russell, chairman of the Armed Services Committee, and Senator Johnson, Senate Majority Leader—have indicated support for the idea of pay increases for enlisted technicians, but they are not enthusiastic about the suggestion for increasing the pay of senior officers. It is particularly doubtful that Congress will support the type of compensation level proposed for generals and admirals which, it has been pointed out, would bring their pay in the case of four-star rank above that of Cabinet members.

The Cordiner committee was established primarily to deal with military pay problems, but its research has led it into areas of related civilian activity which are also pertinent to engineers and scientists. Among its recommendations in this aspect of the study is one to create a

Mr. R. J. Cordiner, President, General Electric Company

"senior scientific and engineering service" in the Defense Department. This recommendation, if confirmed when the report is issued, would be of the greatest significance in the government-wide problem of recruiting and retaining engineers and scientists. As reported, the senior service would be a prestige corps with high-grade engineers, scientists and other professional employees who would be paid higher salaries. One official was quoted as saying that such a group would give the Defense Department's scientists and engineers a "sense of belonging to something special," and would be a "throwback" to the former professional classification which was eliminated in 1949. The reference here, however, is to the government-wide professional classification system which NSPE and others have been seeking to restore for several years. The Moss-Gubser bill, now pending in Congress, would restore the professional classification throughout the government service, and with substantially higher pay rates than those now prevailing.

Among the other reported recommendations in the civilian aspect of the report are those to give engineers and scientists more liberal expense allowances to attend meetings of their professional societies, and to permit the government agency to pay moving and relocation expenses when transfers are ordered. Also, it is proposed that the Defense Department be given authority to use paid advertisements to recruit engineers and scientists.

The advertising authority is somewhat dubious, however, in view of Defense Secretary Wilson's reply to Rep. Davis, chairman of the House Subcommittee on Manpower Utilization, that he will take prompt corrective action against defense contractors for excessive use of advertising and other costs incidental to the recruitment of engineers and scientists. Rep. Davis has waged a vigorous campaign against the use of tax money (through defense contracts) "to subsidize the pirating of engineers for government defense contracts."

The Department of Defense has advised Rep. Davis that it will "attempt to develop quantitative standards of practical criteria to govern these costs which may be allowable in defense contracts of the reimbursement type." Also, the Defense Department said it is establishing a Technical Manpower Utilization Committee "to conduct an investigation of the extent departmental technical administrative procedures affect efficient utilization of industry technical personnel working on military contracts. This study will also consider how best to encourage industry to take active steps to make improvements in the present situation."

Rep. Davis released a report from the Navy on engineering recruitment costs which he said showed that firms with defense contracts spent over ten times as much for recruiting, "even though the commercial business firms had a greater volume of business." He also observed that the report shows the average cost per engineer recruited is much higher for defense contractors. The Navy report listed the average cost of hiring an engineer at $808 for defense contractors compared with $502 for concerns with mostly private business.

It is reported that President Eisenhower has taken a personal interest in this situation and has told Cabinet members and agency heads to take steps to control defense contracts so the Government's engineering and scientific staffs won't be depleted by private contractors. The President is reported to have asked that Government cost-plus contracts be so worded as to limit contractors from paying salaries in excess of those paid by the Government. It is difficult to believe that the proposed control of reimbursable salaries could be as rigid as the report states. If so, in many cases the defense contractor could not be reimbursed for full prevailing salaries for engineers and scientists in private employment, as such salaries are generally higher than those in the Government. Additionally, there is no clue as to how proper comparisons could be made between the Government's engineers and the defense contractor's engineers in terms of qualification, specialization, experience, and type of work. Nevertheless, there are strong signs that there will be some form of "crackdown" on salaries of engineers and scientists in the employ of defense contractors.

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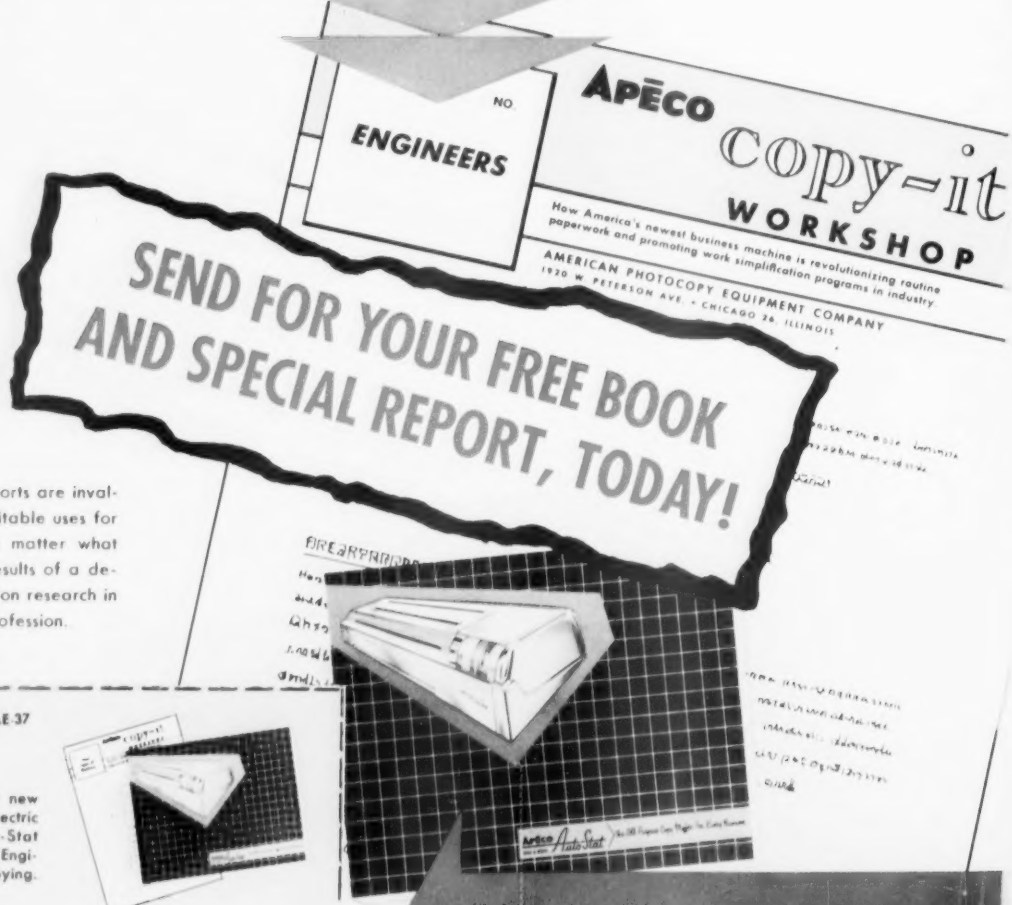
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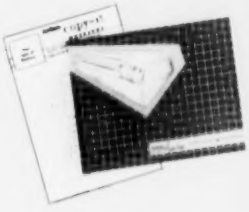

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Engineering Employment Practices

Digest

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ **The Federation of Honeywell Engineers, which represents the engineers and technicians at Minneapolis-Honeywell Regulator Co., has voted to disaffiliate from the ESA, federation of engineering unions, and join the United Auto Workers, AFL-CIO. The union membership voted 579 to 116 for the change after the group representatives council voted sixty-one to four for the affiliation with the UAW.**

Walter Reuther, president of the UAW, and head of the AFL-CIO industrial union department, addressed the engineers and technicians before the vote was taken. He had declared earlier that he regarded affiliation of the Honeywell union as "the first step" toward organization of engineers and technical personnel. The AFL-CIO leader said that engineers and technicians should join "the family of organized labor" to solve their problems.

The UAW has established an Aircraft and Avionics Engineering Council within the National Aircraft Department with the avowed purpose of unionizing engineers, scientists and technicians in the aviation industry. Everett Taft, president of the engineering union, led the drive to affiliate with the AFL-CIO unit because of ESA's emphasis on "pure professionalism," and because they had "substituted snobbery for mutuality." UAW representatives told the Federation members that integration of work-processes under automation makes it "difficult to distinguish between engineers and technicians," and that the UAW could help supply "the muscle" to strengthen the engineers' collective bargaining position.

* * * * *

✓ *The District Federal Court has declined to issue a declaratory ruling on the question whether professional employees are entitled to a separate decertification election when represented by a mixed union. NSPE had supported the suit of the engineers to obtain a separate decertification election. Before the Court ruled, however, the engineers were able to vote themselves out of any union representation when a different union sought to represent them and clerical employees. The Court said it could not issue a declaratory ruling on the question because there was no longer an actual controversy.*

* * * * *

✓ At the recent NSPE Board meeting it was voted to recommend to Congress amendment of the Taft-Hartley Act to clarify the right of professional employees to a separate decertification vote. Also, the NSPE Board approved a recommendation to ask Congress to establish clearly the right of court review of NLRB decisions when it is alleged that the labor board has violated the professional provisions of the law.

* * * * *

✓ **A Federal district court in New York has ruled that the Sperry Gyroscope Co. must arbitrate a dispute with the Engineers Association, ESA, over pay increases granted engineering employees who transferred to the company's Utah plant. The union objected to giving the transferees merit raises on the ground they were transfer bonuses, not subject to the unilateral action of the employer. The court said that the company's participation in the grievance procedure showed that the issue was subject to arbitration under the collective bargaining contract.**

* * * * *

✓ A salary survey of Engineers Joint Council reports 1956 median annual earnings ranged from $5300 for those entering the profession in 1955 to $10,350 for those entering in 1920-24. Other figures based on year of entry, are: 1954, $5,725; 1953, $6,050; 1952, $6,350; 1951, $6,625; 1950, $7,000; 1949, $7,300; 1947-48, $7,700; 1945-46, $7,875; 1940-44, $8,900; 1935-39, $9,375; 1930-34, $9,775; 1925-29, $10,125; 1913-19, $9,750. The report includes comparable figures by type of employment. Copies are available from EJC, 29 W. 39th St., New York 18, N. Y. at $1.50 each.

* * * * *

✓ *A one-day strike of engineers and technicians employed by Western Electric was called on February 14 by the Council of Western Electric Technical Employees-National, ESA. The union said approximately 3300 engineers participated in the walk-out and demonstrations in various locations throughout the country. The strikers were reported to have carried placards denouncing the company for failing to come to an agreement with the union over collective bargaining conditions. The union announcement said the company's action in suspending certain strike leaders would result in the filing of an unfair labor practice charge with the NLRB.*

* * * * *

✓ **In connection with career planning, Orville E. Armstrong and Co., have prepared articles on "Resume Composition," "Professional Career Development," and "Career Planning," as part of its engineering manpower program for industry. The personnel counseling firm offers copies of the articles to interested engineers without charge. Write to: 55 West 42nd St., New York 36, N. Y.**

It Can Be Painless . . .

U. of Wisconsin Sponsors Institute on Report Writing

By Richard A. Garver

A CHORE that chills the enthusiasm of an engineer more than almost any other task—writing a technical report—has been made nearly painless.

Thirty engineers in fields ranging from chemistry to conservation met in Madison, Wis., recently to see if something could be done to ease the burden of report writing. In a three-day session, the men put into practice a procedure which reduces the frustration of writing technical reports and increases readability.

The engineering institute was sponsored by the University of Wisconsin Extension Division's Department of Engineering.

The backbone of this new approach to professional writing is:

1. Write in the same manner as you talk.
2. Organize the report into "blocks" before writing.
3. Use charts or graphs to dramatize your results.

"The engineer's report usually is the main tangible result of his work," declares Prof. George R. Sell, of the UW College of Engineering. "His big problem is to write that report so it will be read and used."

The most effective way to write a readable report—and a principle that generally is ignored—according to Sell, is to use common English.

"We engineers often play slave to the formality of a report," he says, "and forget to convey the information to the reader in the easiest manner."

Here are some points for making technical reporting easier to write—and more readable—which the thirty engineers agreed upon. These ideas involve the use of informal, conversational language to replace dull, often silly grammar practices. The engineer, in effect, "talks his way" through the report.

1. Replace the vague "we" and "it" in your report with the personal pronoun, "I." There is no practical reason, for example, why a test engineer should write, "It was felt that nickle plated containers were not satisfactory for beer." Instead, use the direct statement: "I feel that nickle plated containers are not satisfactory for beer." This is the way you speak; why not write that way?

2. Use present tense verbs whenever possible. Past tense in any writing is a deadening formality. And use active, "doing" verbs instead of inactive verbs that produce dull reading.

3. Use words that are clear, simple, and short. Prof. Benjamin G. Elliot, chairman of the UW Department of Mechanical Engineering, states, "Our job is to enthuse, not confuse!" Clear, conversational writing is particularly important in reports that will travel upward through all levels of management. An immediate effect of writing as you would talk is to make the writing process much easier to carry out. Use technical terms where necessary, but ask yourself if the terms are really needed to convey your findings.

AN engineer can pledge solemnly to use clear, simple English, but this doesn't write the report. It is a paradox that men trained in systematic, scientific thinking often shiver and shake before the job of report writing when the solution to this task actually lies in a systematic approach.

The second key to easy report writing is to set up the task in blocks or sections and do one section at a time. This reduces to manageable size what initially appears to be an awesome project.

It may be more effective to use a standard form to report recurrent situations, such as requests for tests. A typical form report is seldom longer than two pages, plus any analyses or tables attached to the back. The sections of such a report may be ordered like this:

1. Request by .....
2. Test required
3. Object of test
4. Procedure
5. Conclusions
6. Report of test

Only the sections on conclusions and report of test should exceed a paragraph. The procedure section should be a direct statement of the test problem. The conclusions should be enumerated, 1., 2., etc. The report of test section describes the actual test.

The full-size report represents a tougher problem, but if the engineer approaches it one section at a time, the difficulty of writing will largely vanish.

"A technical report is the reverse of a murder mystery," says Sell. "In a whodunit, the reader is kept guessing until the last page. The 'crime solution' of a technical report should be the first thing available to the reader."

While no outline has been devised to cover all types of reporting, here's the method for "blocking" each section of a report which the thirty engineers found practical.

1. Title Page.

The job of a title is to tell all by itself what is in the report. Using as many words as are needed, write in one sentence the purpose of the project or test. Then start cutting words and compressing the title.

2. Table of contents and list of illustrations.

These two pages are completed after the report is written and are merely lists of section headings and graphs or charts.

3. Introduction.

Offer the reader a crisp statement of the problem and the structure of the material to follow. By doing this you provide the reader with guideposts to follow in reading the report. Ask yourself, "What is the very least the reader needs to know of the background data in order to understand the problem?" Avoid a historical development. A long-winded, stuffy introduction can kill reader incentive immediately.

4. Conclusions.

This is the most vital section of the report, the "solution" to the technical whodunit. It's the writer's job to include here what he wants to leave with the reader. Take a hint from newspapermen who place the essence of a story in the first few paragraphs of a story.

One technique for writing the conclusions section is to imagine that the chief engineer is in your office asking, for example, "Joe, what are you doing on that test of stroke counters?" What would you reply? You'd tell him briefly what testing had been done and what the results are. The conclusion section should be nothing more than this. Write it as you would talk. Good writing is like good conversation; it is clear and to the point. Enumerate your results in a series of points. Later on you can edit your writing to clear any vagueness and prune out useless terms that will creep in.

5. Developing.

The developing section is for the man who wants to know about the project in action or how the tests were run. Computational procedures, however, should be placed in an appendix. The extent of the development section must be largely determined by your material and the use for which it is planned. This section is particularly vulnerable to technical jargon. From the practical viewpoint of someone who may want to duplicate your study in the future, this section should be written in as clear and simple manner as possible.

6. Summary.

A summary may be desired. In most reports, however, a summary is not necessary. If you have stated clearly in preceding sections what has been done and what are the results, a summary may be omitted. If a summary is required, this section should provide a restatement of the problem, procedure and results. When you have said this in brief, be brutal and end by putting down that final period.

7. Appendix.

Place all calculational data, project history, and bibliography in this catch-all. Such detailed information, when included in the body of the report, can slow to a crawl the reading of the report.

AN engineer's stock-in-trade is numbers. And, according to Prof. Paul J. Grogan, director of the UW Engineering Institute, any operation that involves numbers can be represented graphically.

"Missiles hit their target if the trajectory is known," declares Grogan. "Graphs and curves are the sought-after trajectories in the worlds of business and science."

Graphs also can become too complicated. More than two relationships tend to clutter the illustration and reduce comprehension. Check to see what other firms are doing with graphs. The "Outlook" charts of the U. S. Department of Agriculture also provide a good example of what can be done with complex statistics. Another source of graph information is the ASA Standard Z15.3-1943 ("Engineering and Scientific Graphs for Publications") published by the American Standards Association.

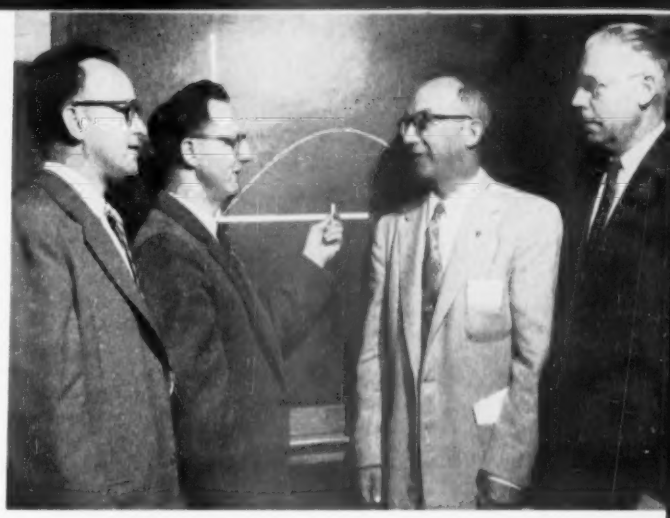
Use pictures in your report if they can help explain some point. Color in your charts and graphs also will liven the report.

Organization is a major aid in writing a report, but the professional touch of writing comes only with revising and editing of the initial draft. Let the draft copy sit for a day or two before you attempt this.

Horticulture experts have a saying, "No man should prune his own apple tree." Let a friend read the report and see if it really is as clear as it appears to you. Also, try reading the report aloud. Repetitious phrases and long sentences will reveal themselves. And, finally, check your report against these guides:

1. Is the problem well-stated?
2. Are results stated clearly?
3. Are conclusions well-supported?
4. Are technical terms understandable?
5. Is the organization compact?

Simple, conversational language and good organization can take the drudgery out of technical writing. Your reader will appreciate it, too.—***End.***



Some of the points in making the task of technical reporting easier for the engineer are studied by four of the men who attended the institute. They are, l. to r., Lewis E. Johnston, University of Wisconsin instructor of mechanical engineering and institute coordinator; Lawrence F. Motl, chief conservation engineer, Wisconsin Department of Conservation, Madison; Howard Leonard, test engineer, Vapor Heating Corp., Chicago; and Richard J. Lang, engineer in charge of general laboratory, Line Material Co., South Milwaukee, Wis.

Graphic presentations can put impact into your report. Discussing the use of graphs and charts are four engineers who attended the institute on technical expression. They are, l. to r., Chester P. Surprise, field engineer, Johnson Service Co., Milwaukee, Wis.; George R. Sell, assistant professor of mechanical engineering at the University of Wisconsin; Harold G. Palmer, professor of industrial arts, Iowa State Teachers College, Cedar Falls, Ia.; and Raymond A. Krueger, electrical engineer, Wisconsin Public Service Corp., Green Bay, Wis.

Late News on Legal Rulings

Wage-Hour

In a decision of vital importance to the engineering profession, the U. S. District Court for the Eastern District of Virginia has ruled that consulting engineering services are not subject to the Wage-Hour provisions of the Fair Labor Standards Act. The basis for this decision is the finding that draftsmen, field men and stenographers employed by the consulting firm in question are neither engaged in the production of "goods" for commerce within the meaning of the Act nor are these same employees engaged in commerce within the Act.

The Secretary of Labor sought injunctive relief against Lublin, McGaughy and Associates, a Norfolk-Washington consulting engineering and architectural firm, alleging that the firm had violated the Wage-Hour law in that certain of its employees were not paid at the rate of time and one-half for work in excess of forty hours per week. The firm is engaged in providing the usual consulting services for a variety of clients, and has its principal office at Norfolk, Virginia, and a branch office at Washington, D. C. The employees involved in this controversy are in the categories of draftsmen who prepare drawings, plans, specifications and estimates many of which are transmitted across state lines; field men who travel across state lines to make surveys and gather data; and stenographers who type letters and other documents which are mailed to points out of the state. The contention of the Government was that these employees were engaged in commerce or engaged in the production of goods for commerce, all within the Wage-Hour Act.

In dismissing the complaint, Judge Walter E. Hoffman strongly agreed with a ruling of the Federal District Court in Maryland in the case of *McComb v. Turpin*, decided in 1949 (AE, March, 1949). "The legal question presented has been heretofore expressly decided by the able opinion of District Judge Chesnut in *McComb v. Turpin*," he said. "To elaborate on the scholarly discussion of the problem by Judge Chesnut would constitute idle repetition of the sound reasoning advanced by a distinguished jurist. With minor exceptions, the *McComb* case covers the entire scope of the present controversy." The *McComb* case, deciding that consulting engineers were not subject to the Wage-Hour Law, ruled that plans and drawings are only a physical embodiment in words of professional conclusions, and that the employees' activities are only incidental and remotely related to the production of the goods or instrumentalities of interstate commerce, rather than closely related as the Act intended. In that case Judge Chesnut declared: "Certainly the word 'goods' could not be construed to include professional advice and its definition should not be construed to include the typewritten or mechanical expression by which the advice is given. These plans, drawings and specifications are not themselves the subject of barter or sale, but only the written embodiment of professional advice, and incidental thereto. They are specifically prepared to meet the particular problem of a specific client and are not sold or offered for sale to the public generally."

The court recognized that a decision of the U. S. Court of Appeals for the Eighth Circuit (*Mitchell v. Brown*, AE, August, 1955) is contrary to the present decision and the *McComb* case. The *Brown* case, in ruling that a consulting engineer firm was subject to the Wage-Hour Law, declared that the preparation of plans and specifications for the repair and improvement of existing instrumentalities of commerce, together with the activities of resident engineers at the actual job site, were sufficient to bring them within the coverage of the "in commerce" phrase of the Act. In spite of this contrary Court of Appeals ruling, Judge Hoffman stated: "Even though *Mitchell v. Brown* may be considered in conflict with *McComb v. Turpin*, this Court finds itself unable to disagree with the able discussion of the subject by Judge Chesnut."

In commenting on the attempts to extend the coverage of the Act, the Court said: "Congress may determine to broaden the scope of the Fair Labor Standards Act to include all persons remotely connected with interstate commerce. Stenographers and law clerks or apprentices in legal offices may ultimately come within the Act as their daily work requires them to handle correspondence, legal briefs, and other documents which are continuously being forwarded across state lines. When such a point is reached the Act will be all-inclusive and the employees of every business or profession will be subject to its provision."

Regardless of the degree of interstate activity of the employer's business, in order to hold certain employees covered by the Act, it must be shown that these employees are either engaged in the production of goods for commerce, or are directly engaged in commerce. As noted by the Court: "Whether employees are covered by the Act does not depend upon the nature of their employer's business, but upon the character of their own activities."

The controversy and attendant problems over the applicability of the Wage-Hour Act to consulting engineers still have not been solved by this decision, though the case is of utmost importance to professional groups since it represents authority in favor of the position taken by consulting engineers. The present case and the *McComb* case represent the views of two Federal District Courts that the Wage-Hour Act is not applicable to the services of a consulting engineer. The *Brown* case, on the other hand, is a Court of Appeals ruling to the effect that such services are subject to the provisions of the Act. That decision is binding on the lower courts in Iowa, Missouri, Minnesota, Arkansas, Nebraska and North and South Dakota. A request for a Supreme Court review of the *Brown* case, in which NSPE had participated as a "friend of the court," was denied by the Supreme Court without reason. Should the present decision be appealed by the Government and affirmed by the Court of Appeals, a situation would present itself wherein two Circuit Courts of Appeal have issued contrary rulings. In that situation a Supreme Court review would be more likely because of the conflict between circuits.

Corporate Practice

Registered professional engineers, architects and land surveyors in Virginia were recently informed that corporate practice of their professions is illegal and any contract entered into by a corporation or firm

for the purpose of furnishing professional services is void and unenforceable. They were further informed that approval by them, for a fee, of plans, plats and specifications prepared by non-registered persons, constituted deceit in professional practice and was a cause for certificate revocation.

The above notice was transmitted by open letter from the Virginia Department of Professional and Occupational Registration to all registrants of the Virginia State Board for the Examination and Certification of Architects, Professional Engineers and Land Surveyors. This letter was the result of the Department's attention being directed to the practice, in some areas of the State, of registered professional engineers, architects and land surveyors approving, for a fee, plats, plans and specifications prepared by persons who are not holders of certificates issued according to Virginia law. In other words, the registered professional was placing himself in a position as an employee of the unlicensed person. The letter declared that such conduct was contrary to Virginia law, and that "The Board feels . . . that the above constitutes deceit in professional practice which is one of the causes for revocation of certificates."

The letter was also concerned with the problem of corporations practicing the professions of engineering, architecture and land surveying. The Department felt certain that each individual holding a certificate from the Board "is aware of the fact that when the Board issued him a certificate it was issued to the registrant as an individual and as such did not convey the right of the registrant to practice as a corporation or firm. Corporate practice . . . is illegal and any contract entered into by a corporation or firm for the purpose of furnishing professional services is void and unenforceable." This opinion was based on the fact there are no provisions in the applicable Virginia statutes giving the Board authority to issue certificates other than to individuals, and that Virginia's highest court has held it to be a prerequisite that a person secure a license before he may lawfully perform the services of an architect, professional engineer, or land surveyor (AE, April, 1956). The letter quoted from this court decision as follows: "In general, it seems to be well established that where a licensing statute is a police regulation, having for its object the protection of the public, making it unlawful for a person to engage in a business without a license, and imposing a penalty for its violation, a contract made by an unlicensed person is void and unenforceable."

Going a step further, the Department opined that such a contract is unenforceable even though the corporation officers are duly licensed as architects or professional engineers since the registered persons are but mere employees of the corporation. The letter concluded "that only individuals who are duly licensed under the proper statutes are permitted to practice their respective professions as individual contractors and not as a corporation or firm."

Continued cooperation in helping to enforce the registration law was solicited from each individual registrant.

Wisconsin Revision

A revision of the Wisconsin registration law for architects and engineers which clarified the right of professional engineers to design, plan and supervise the construction of all buildings has been upheld by a Wisconsin Circuit Court.

Mark T. Purcell, a registered architect, brought suit against the Wisconsin Registration Board of Architects and Professional Engineers claiming that the revision, which removed the limitation on professional engineers to the design and construction of "industrial" buildings and the "structural members of other than industrial buildings," eliminated the distinction between architects and engineers and discriminated against the architects. He sought a judgment declaring the amendment invalid, and an injunction restraining the Board from issuing certificates to professional engineers.

In dismissing the complaint the Court declared that while a member of a class has a right to object to discrimination in favor of others of the same class, Purcell has no right to complain of discrimination in favor of others in a different class, that of professional engineers. It was further pointed out that the law does not recognize the right to be immune from competition.

In answer to Purcell's claim that the revision brought engineers and architects into one class, the Court declared:

> **"It is true that the amendment increased the activities of professional engineers to be coextensive with that of architects; but a very important distinction still remains, and that is the title each was permitted to use. Plaintiff's contention that since the amendment an architect can use the title of 'professional engineer,' and vice versa, is not true. To use the title of 'architect,' one must be registered as an architect and pass educational requirements which differ from educational requirements for professional engineers. The distinction is recognized in the legislation."**

The Court noted that difference in title is extremely important to the public, stating:

> **"In the mind of the public architecture is associated with beauty of design, grace of line or art. Professional engineering enjoys no such association. This is a tremendous competitive advantage when it is remembered that by usage over the years the public has been trained to think of and look for architects such as our own nationally known architect Frank Lloyd Wright, when it comes to building design, rather than professional engineers.**
>
> **"The amendment did increase and enlarge the activities of the professional engineer, but a very important distinction still remained" the Court said. "That distinction is one of title and not of ability to perform. It is probable that the legislature considered the professions equally qualified to design buildings, in so far as the health, safety and welfare of the public is concerned."**

In concluding that the allegations of the complaint were not sufficient to show a violation of constitutional rights and privileges of the architects, the Court quoted from a similar Wisconsin case:

(Continued on page 181)

NSPE State Presidents' and Secretaries' Conference—March 7-9, 1957, Memorial Union, Purdue University, Lafayette, Indiana.

Wyoming Society of Professional Engineers—Annual Meeting, March 14-15, 1957, Casper Wyoming.

Kansas Engineering Society—Annual Meeting, March 15-16, 1957, Town House, Kansas City, Kansas.

Ohio Society of Professional Engineers—Annual Meeting, March 28-30, 1957, Neil House, Columbus, Ohio.

Illinois Society of Professional Engineers—Annual Meeting, April 11-13, 1957, Sherman Hotel, Chicago, Illinois.

Massachusetts Society of Professional Engineers—Annual Meeting, April 13, 1957, Thompson Club, Nahant, Massachusetts.

Florida Engineering Society—Annual Meeting, April 24-27, 1957, Angebilt Hotel and San Juan Hotel, Orlando, Florida.

NSPE Annual Meeting—June 6-8, 1957, Statler Hotel, Dallas, Texas.

Successful Engineers' Week Indicated By Early Reports

"BIGGER and better" were the words for the 1957 National Engineers' Week, February 17-23.

Preliminary reports from the nation-wide observance indicate that the Week had a more extensive participation by engineering groups than ever before in the seven years since it was started by NSPE.

On the basis of promotional material distributed by the National Society, the 1957 Week was ahead of all previous observances. Totals for this material included the distribution of nearly 9,000 copies of the booklet *Engineering . . . America's Great Resource*; 20,000 small posters; 260,000 gummed seals; 600 newspaper mat stories; and sizable quantities of tape recorded radio programs, metal logotypes, and TV films and slides.

An added feature this year was the use of the color film "American Engineer," produced by the Jam Handy Organization. Two hundred prints of this film were ordered by NSPE groups, with many chapters scheduling the film several times during the Week.

A definite increase in the number of special newspaper sections devoted to engineering was also noted. Many of these sections carried a heavy percentage of advertising, and reflected considerable cooperation between local chapters and newspaper offices.

On the radio and TV scene, the Week was sparked by an increase in the number of network announcements, many being on "prime time" programs with audiences numbered in the millions. Outstanding among these was the intermission announcement on the General Electric Theater Sunday evening, February 17. The announcement featured a description of a career in engineering given to a young student. A large-size Engineers' Week poster was prominently displayed in the background.

Engineers' Week announcements were also made on the Farm and Home Hour, and on a large number of radio and TV network programs throughout the Week.

Totals for the locally sponsored radio and TV programs and announcements during the Week would probably run close to a thousand. The National Society distributed several hundred sets of spot announcements, in addition to the sets included in the 1,300 Engineers' Week kits.

Distribution of 15,000 copies of President Eisenhower's communication on the Week were made to industry, libraries, schools, newspapers, and the engineering journals.

The 1957 Engineers' Week poster design and theme appeared in national and local advertising during February. Newspaper and magazine editorial comment on the Week was also extensive. Editorials saluting the profession have been received from large and small newspapers throughout the country.

Support and cooperation for the Week on the state level was demonstrated by the number of proclamations and special tributes issued by governors. The photographs accompanying this article are only a few of the many received by the AMERICAN ENGINEER.

Don't forget those reports! All state society and local chapter Engineers' Week committee chairmen are urged to send complete reports on the Week's activities in their areas to the National Society office, 2029 K Street, Northwest, Washington, D. C. All reports will be kept on file for one year, and may be inspected by NSPE members visiting the National Society headquarters. Make sure your group is represented in this National Engineers' Week record of achievement.

Industrial house organs and other publications featured Engineers' Week material throughout February. Typical of these was the special February issue of "Engineering News" published by Du Pont.

All Engineers' Week committee chairmen are urged to send complete reports on local activity to the National Society office in Washington. The reports should include any photographs of exhibits, samples of promotional material distributed, copies of proclamations, local newspaper clippings, banquet programs, and a listing of special events such as career conferences for high school students, film programs, and speaking engagements.

These reports give the National Engineers' Week Committee a nation-wide view of the activities of the Week at the state and local level. The reports are studied carefully as a source of ideas for the development of promotional material for the next observance. All reports are kept on file for one year in the National Society office, where they may be inspected by members visiting the headquarters building.

Questionnaires regarding the material distributed by

Richard J. Daly, mayor of Chicago, fourth from left, gets some first hand information on National Engineers' Week. Others are, l. to r.: John G. Duba, president of the Chicago Chapter of the Illinois SPE; Dean Harold Gotaas, Northwestern Technological Institute; and George L. DeMent, Chicago, Commissioner of Public Works.

Governor William Stratton, left photo, puts his signature to a proclamation concerning Engineers' Week for the State of Illinois. Behind the governor are Charles K. Willett, left, and Clarence W. Klassen. At right, the "Week" becomes official in New Jersey as Governor Robert Meyner signs a proclamation. Seated are George N. Dign, president of the New Jersey SPE, and Gov. Meyner. Standing are, l. to r.: W. Earl Christian, Society vice president; Lewis P. Randall, chairman of the public relations committee; and Charles J. Dodge, executive director.

NSPE have been sent to all local chapters and state societies. These should be filled out and returned to the National Society office as soon as possible.

John L. Bahr, 1957 National Engineers' Week Committee Chairman, stated that the questionnaires are "extremely important for evaluating the promotional material prepared by the National Society."

Mr. Bahr emphasized that the questionnaires "provide a means for the local Engineers' Week chairmen to sum up their opinions as to the relative worth of the various items furnished by NSPE."

The questionnaires were mailed with the last "Action Letter" of the 1957 observance.

Photographs and news stories on the Week for the April issue of the AMERICAN ENGINEER should be sent to the magazine by March 18.

An early round-up of 1957 activities for the Week showed local chapters and state societies sponsoring a wide variety of events. The Massachusetts SPE reports a half hour TV program courtesy of I.B.M., and a "sellout" luncheon with the Advertising Club of Boston. A file of newspaper and magazine clippings indicates the acceptance of the Week in that state.

Down in Tennessee, the *Knoxville News Sentinel* carried an editorial on the ideas of the Week, and local groups obtained nine window displays in that city.

In Richmond, Va., some 400 engineers, representing sixteen societies, gathered at the John Marshall Hotel for an Engineers' Week dinner meeting. John Pershing, general manager of the Richmond-Petersburg Turnpike Authority spoke on "The Turnpike's Effect on Local Citizens."

A 32-page special section devoted to engineering was obtained in the *Waukesha Daily Freeman* by the Waukesha Chapter of the Wisconsin SPE. The Chapter also had radio and TV announcements, and a dinner meeting.

The Central Illinois Chapter of the Illinois SPE obtained newspaper publicity, sponsored two half hour TV programs, one featuring high school seniors planning for careers in engineering, and showed the film "Eager Minds" to more than 3,000 high school students.

Out in Kansas, the Wichita Professional Engineering Society held an Engineers' Week banquet, furnished speakers to local groups, and sponsored displays, radio and TV programs, and a student open house program with the University of Wichita.

The *Toledo Technical Topics*, official publication of the Toledo Technical Council, saluted the Week with a color reproduction of the 1957 poster design on the cover of the February issue. Council President Eugene V. Newman devoted his full page editorial to the Week's events in the Toledo area.

Among the many other publications paying tribute to the Week were the *New England Professional Engineer*, the *Akron Technical Topics*, *The Ohio Engineer*, the *New Jersey Professional Engineer*, and the *Hughes News*.

In the Nation's Capital, the District of Columbia SPE sponsored and manned a booth at the annual Home Show. The members distributed literature on engineering as a career to interested young people, and exhibited a model of the proposed space satellite.

Governor George Docking signs Engineers' Week proclamation for Kansas. Looking on are William F. Ryan, left, of Salina; and Malcolm M. Steele, of Olathe.

Management Looks At Patents

By

CLYDE H. HAYNES, P.E.,

Patent Attorney,

Elyria, Ohio

EVERY business, large and small, individual, partnership and company is aware of patents.

A patent is a non-renewable contract between an inventor and the Government. As a part of the patent contract, the inventor must define his invention. The definition of the invention is acutally the claim or claims appearing at the end of the patent. Reaching an agreement on the claims usually takes from two to five years of correspondence, searching, rewriting, etc., on the part of the inventor and the patent office personnel who have the power to enter into the patent agreement on behalf of the Government. The remainder of the patent is devoted to a description of the invention and teaches the public how to duplicate the invention.

An inventor or his company or assignee can manufacture, use, or sell his invented product without having a patent. *A patent gives the inventor or patent owner the right to stop others from manufacturing, using, or selling the patented device for a definite period of time providing the patent is valid.* It is entirely up to the owner of the patent to decide whether or not he wants to enforce his patent rights. In his decision the owner must keep one thing in mind—i.e. the Government does not guarantee that his patent is enforceable and valid.

A patent, invention or secret can be bought and sold or rented and leased just like any other personal property. Companies own many patents because they have bought or leased them from their employees or other parties. Only the inventor (except in rare instances) can enter into a contract with the Government to obtain his patent. One of the requirements is that the inventor take an oath that he believes himself to be the first inventor and that there has been no public use or publication for more than one year prior to his patent application.

No company takes out a patent. Its employee starts the negotiations with the Government for a patent. Generally the employee then assigns his rights to his employer, thereby transferring ownership of the patent application to the company. This assignment again is a contract between the inventor and the company and enables the company to proceed with negotiations for the patent issuance.

The majority of companies have an employment agreement wherein an employee agrees to transfer ownership of any invention he might make to the company when he starts his employment. His regular pay is the consideration for this agreement. For good employee relations these agreements are limited to those inventions which relate to the business of the company. As a security and protection, the agreement usually covers inventions made within a definite period of time after employment ceases.

AN active patent program reimburses a company in ways other than the use of patents as a sales or competition retarding tool.

1. There is a wealth of engineering information in issued patents. A review of patents relating to a particular product or development indicate the attempts others have made to solve a problem. It is fairly easy to build up a history of various solutions to a problem and know exactly what others did in trying to solve the problem. Very often a person will spend up to several years of his life working on a particular problem, find an answer, and then obtain a patent. Anyone can buy a copy of the

First major change in adding machine keyboard design in nearly fifty years is tested by Secretary of Commerce Sinclair Weeks, at exhibit in Department of Commerce, Washington, D. C. Robert C. Watson, left, Commissioner of Patents, watches as Secretary Weeks tries out Friden adding machine held by Lawrence B. Taylor, vice president, Friden Calculating Machine Co., Inc., San Leandro, Calif. Taylor patented keyboard design to accommodate natural position of hand. The display was at the exhibit, "Research and Progress in Business Machines," showing significance of the U. S. patent system in modern business.

patent for $.25 and in a few minutes' time get a general picture of the results of those several years' work. After reviewing several of these patents, engineers are able to eliminate many possible ways of doing the job without spending considerable time and expense in duplicating the efforts of the prior patentee.

2—Patent studies stimulate creative engineering thinking and designing. In reviewing patents, engineers obtain new ideas and can use the best part of each of the different methods proposed by the prior patentees to develop their own solution or new product.

3—A great part of the value of many companies has been measured on the accounting records by relating it to the patents owned. It is interesting to note that every time a company starts to work on a license agreement management will run for a list of patents. Every time management thinks of purchasing or acquiring rights in a new product, it looks into the patents. Patents, thus must give something which is tangible and which can be used in an effort to evaluate advancement or the value of the business. Management even takes patents into account when considering its best tax analysis.

4—The public uses patents as a measure of the value of the company as well as the advancement of the company. They feel that a growing company is inventing new products as evidenced by the number of patents issued to it.

5—Stockholders are more interested in a company which has an active patent program. Each year many companies devote a part of its annual report to its patent picture, thus showing that stockholders and management look upon patents as a means of indicating the value of advancement of the company.

6—Patent applications and patents serve as a psychological stimulus to development men, both in the field of sales and in pure research laboratories. No man likes to feel he is not capable of improving someone elses accomplishment. The filing of a patent application is the same as a pat on the back to an employee. His ego is built up and he works better, thus will turn in more products or ideas to again raise his prestige among other employees and friends.

From a strictly business point of view patents may be classified in two categories:

1—Defensive patents;

2—Progressive patents.

A DEFENSIVE patent is not the foundation of a new industry. It is of the type which covers a new minor improvement or variation of a basic product. A defensive patent is valuable to a company in several ways.

1—Patents owned by one company often eliminate expensive litigation with another company. When two companies are in competition, each watches its patent picture to see that the other is not infringing its patents and that it is not infringing the others patents. At times specific development runs right smack into a competitor's patent. When this occasion arises, it is very helpful to have patents which would be of value to the competitor. Instead of infringing patents and having expensive litigation, the companies can grant licenses to each other and each proceeds with its plans, the problem of patent litigation being eliminated.

2—Expensive patent litigation with an independent inventor is often stopped by a company owning a defensive patent. For example, a company has a product on the market and has developed and sold many variations of that product over a period of several years. Inventor X works alone independently of the company and develops a variation of this product and obtains a patent on it because the company failed to do so when its men first invented the product. Several years later the company again markets this particular variation because economic or other conditions indicate it will make them money.

What happens—Inventor X believes the company is infringing his patent and should pay for it. He does not know his patent is not enforceable because he was not, as he believes, the first inventor, and because the product was known and used prior to his invention. After both Inventor X and the company spend several thousand dollars each (it is not uncommon for a company to spend $20,000 to $50,000 defending itself in such a suit) the patent is declared invalid and unenforceable. Both parties have lost money and neither has gained anything.

Let's look at such a picture from the business point

Time and patents march on. At the left below is shown a ready-mix concrete agitator truck, vintage 1928, and on the right is a modern-day job.

—Photo by Blaw-Knox

of view. It is the company's fault that it had to spend thousands of dollars in litigation to maintain a market it already was entitled to. Had the company obtained the patent it could have saved $20,000 to $50,000 by a small original expenditure.

3—A company can give its customers better assurance that the customer would not get involved in patent litigations with others if the company has a defensive patent. Many companies prefer to purchase new products from those who own the patents. It would not be good business for them to buy $500 worth of materials and then get tangled in a $20,000 lawsuit because they are using those materials.

4—Patents also keep an open market for products. The manufacturer or sales organization is assured no one else will obtain a patent and hamper its sale or use of the product in a special area.

5—When a company grows larger, its public relations become more difficult. More people submit new ideas to the company, in the form of inventions. A company can very easily lose its prestige if these people believe they have been "cheated" by the company. Management realizes that many times these inventions were already known by the company, but how does it prove it to would-be ininventors? If company records are used, these would-be inventors will always have the feeling that those records were forged or specially prepared. However, if the company pulls out an issued patent, which is on public record, the inventor is completely satisfied.

A PROGRESSIVE patent is one which can be the foundation of a new industry and covers a major improvement, a new process or product.

Progressive patents can seldom be used successfully as a way to make prospective customers buy a product. No customer will buy because he has to, if he can possibly find an alternative. All customers buy on the basis of service, quality, and fair price. However, a progressive patent is valuable in keeping competition low while preparing for future competition for several reasons.

1—A progressive patent actually gives a company seventeen years from the issuance of the patent to get their house in order to meet competition on an open market. During this time the company must find economical methods of production, sales, distribution, best quality, customer requirements, etc. If the company does not, a prospective competitor will have analysis made and start production the day the patent expires, possibly at lower cost. Thus, competition is in and there is very little chance of eliminating it.

2—A progressive patent prevents others from making "Chinese" copies at lower cost and without paying any of the development costs. A patent of this type is generally respected by those who would not hesitate to infringe a defensive patent. They realize they would have a very poor chance in court and would end up losing money.

3—Progressive patents are used as a measure to justify research expenses and are the basis of licenses which help defray these expenses. Some large companies grant a royalty paying license to their competitors under such patents. Whether right or wrong, their theory is that it is better to get a patent income than take the chance of the competitor finding a substitute which is better and would not infringe their patent. Also competition is good for a company. It broadens the market faster and keeps the company on its toes in making the product cheaper and better. A larger and healthier company evolves when there is competition during the patent life. The company is ready for any and all types of competition at expiration of the patents.

We have mentioned granting licenses to competition. These may be exclusive to limited territory or industrial field or to a specific design of the product. Care should be taken that antitrust laws are not violated by the conditions of the agreement. An assumed example of a license is where Company A allows Company B to make, use and sell bottles under its patent. Company A is making round bottles and does not want a competitor making round bottles. Therefore, it allows Company B to make square bottles and sell them in competition. If Company A gave Company B the exclusive right to make square bottles only, it would not be able to make them itself without violating the license agreement. On the other hand, it could license a third person to make other shapes, excluding square bottles. In such a case, Company A is allowing sufficient competition to keep it on its toes and yet is controlling competition sufficiently to allow it to build for future competition when the patent expires, and by being ready to meet any newcomer, makes the field less attractive to prospective newcomers. As earlier pointed out, a patent gives the right to prevent others from (a) making, (b) using, or (c) selling the patented invention. Thus, a license may be given, whereby the competitor has only the right to make or use the invention, but does not have the right to sell it. Such a license may be profitable when a large manufacturer has machinery to make the item for its own needs at a savings on transportation. The royalty could be in a set proportion to the transportation savings. Many other types of license agreements are possible. Each agreement should be prepared after careful consideration of exactly what rights are to be extended and where the boundaries are to be.

No company can use its patents to restrain trade or create a monopoly, cartel or otherwise attempt to control trade on non-patented articles. The rights under a patent are specific and cannot be extended beyond the patent. History shows how companies have attempted to build monopolies under the guise of Patent Pools." This led to

(*Continued on page 49*)

About the Author . . .

Mr. Haynes

Clyde H. Haynes is engaged in the private practice of patent law in Elyria, Ohio. A registered professional engineer in the State of Ohio, he received a bachelor of electrical engineering degree from Fenn College, and a bachelor of laws degree from Western Reserve University. After acquiring the latter degree in 1947 he was admitted to the practice of law in both the Ohio and Federal Bars and to the practice of patent law before the U. S. Patent Office, and the Canadian Patent Office.

Until he recently began his practice, Mr. Haynes had been manager of the Patent Department of Gregory Industries since 1951. The combining of engineering and legal aspects made it possible for him to aid Gregory Industries organize methods of exchanging engineering information throughout the world with other companies. Mr. Haynes has held various offices in the Lorain County Society of Professional Engineers, and is currently vice president.

NSPE President Robert J. Rhinehart Presides

Montana Joins NSPE . . .

Road Contracts, Unionism, Receive Board Attention

OPPOSITION to a recent U. S. Bureau of Public Roads recommendation regarding the employment of engineers on Federal aid highway projects was expressed by the NSPE Board of Directors at the Society's spring meeting in Charleston, S. C., February 15-16. The Board voted to oppose the Bureau's recommended clause in state highway construction contracts that forbids a consulting engineering firm to engage any professional or technical personnel who are or have been, during the period of the contract, employees of the Bureau or of state, county, or city highway departments.

The Board approved a report of the NSPE Engineering Practices Committee in which it was stated that such a policy would have the effect of "freezing highway department employees to their jobs or forcing them out of the highway program entirely."

In another important development, a new state society was added to the NSPE family when the Board accepted a petition for affiliation by the Montana Society of Engineers. Dix C. Shevalier, Montana national director, presented the petition. An official charter will be granted to the new affiliate—NSPE's forty-second state society—in the near future.

The Directors also voted approval of a committee recommendation to circularize information on a professional liability insurance policy for registered engineers. The policy would protect the insured against any claims arising out of the performance of professional services.

A report was made to the Board by the chairman of the NSPE Engineers-in-Industry Committee on the efforts of the United Auto Workers to unionize the nation's salaried engineers. In describing the efforts of UAW President Walter Reuther to aid in this campaign, the report called attention to Reuther's statement that engineering and technical personnel must join "the family of organized labor" in order to solve their own problems.

In giving his report, Engineers-in-Industry Committee Chairman Wayne Ault, of Youngstown, Ohio, stressed the National Society's long opposition to unionization for professional engineers.

In other business at the meeting the Board of Directors voted an endorsement and support of the "Moss-Gubser Bill" now before the House which proposes the reestablishment of a professional schedule for engineers and other professional employees of the Federal Government.

The Directors authorized the Engineer-in-Government

A typical Board session at the recent meeting in Charleston, South Carolina

Chairman Wayne Ault of the Engineers-in-Industry Committee addresses the Board while Vice President Garvin H. Dyer looks on.

Subcommittee to confer with the sponsors of the proposed legislation and with staff members of the House Civil Service Committee on the inclusion of a suitable registration clause, and on the feasibility of revising and adding to the list of employees to be covered by the professional schedule.

Reports from three committees were submitted to the Board concerning the National Society's efforts in the field of education.

Dr. Anatole R. Gruehr, of New York, chairman of the Committee on Engineering Preparation, submitted a report recommending that NSPE endorse the activities of the National Committee for the Development of Scientists and Engineers, and the science teaching improvement program of the American Association for the Advancement of Science. The Board voted approval of the recommendation that NSPE offer its assistance in implementing the educational programs of these organizations.

Other reports on education were made to the Board by Robert B. Rice, Raleigh, N. C., chairman of the Education Committee, and Dr. Clark A. Dunn, Stillwater, Okla., chairman of Ad Hoc Committee on Federal Legislation for Engineering Education. The Board approved a recommendation from the latter committee that NSPE favor Federal assistance to science and engineering students at the graduate level, but oppose legislation that will provide direct financial support from Federal funds for students who have not completed their undergraduate program.

All-day conferences were held in conjunction with the spring meeting on an ideal registration law, and a proposed brochure outlining rules of ethical conduct designed to assist in a better understanding of the canons of ethics for the engineering profession.

Representatives from major engineering organizations attended both conferences and participated in discussion panels. Comments and suggestions regarding the ideal registration law and the ethics brochure were recorded for further study by the Registration Committee and the Ethical Practices Committee.

Major General Louis W. Prentiss, executive vice president of the American Road Builders' Association, spoke on "Engineering . . . America's Great Resource" at the banquet session. General Prentiss emphasized that "highway engineers of our country have a tremendous job of engineering ahead of them to plan and supervise the construction of 100 billion dollars of highways of all kinds in the next fifteen years."

Clement J. Freund, dean of engineering at the University of Detroit, spoke on "Registration and the Screening out of Scoundrels" at a luncheon meeting February 14.

An extensive program for the ladies was also on the agenda, which included several scenic tours throughout historic Charleston.

The Charleston Chapter acted as hosts for the affair. William L. Schachte, chapter president, was general chairman of a committee which handled the many details. Serving with Mr. Schachte was Co-Chairman Joseph G. Hollowell and Treasurer Charles Kanapaux. The various committee chairmen included Mr. Hollowell, arrangements; Mr. Schachte, entertainment; Frederick A. Bailey, III, exhibits; Mrs. Wilson E. Crews, ladies auxiliary; Herman J. Williams, program printing; Wilson E. Crews, publicity; Louis M. Andrews, reception, and Myron W. Cole, Jr., registration.

The Committee reports follow:

FUNCTIONAL SECTION FOR CONSULTING ENGINEERS IN PRIVATE PRACTICE

Since the Section's last report, the principal activities undertaken by the Section and its several task forces have been Professional Liability Insurance, an extension of our studies on fees in the several states and territories, further studies with regard to the practical aspect of ethical practices and the preparation of a program for the forthcoming symposium at the annual meeting in Dallas. Other matters of more routine nature have been handled, notably the problem of professional fees and conditions referred to the Section by the Engineering Practices Committee. It will be remembered that this matter originated in a request from the Washington Society of Professional Engineers. We are pleased to report to the Engineering Practices Committee that a favorable solution has been secured at the state level.

TASK FORCE NO. 2—FEES

This task force is intensifying its efforts and extending its studies. Chairman Frank Sanford has requested an enlarged committee and additional participants have been requested to assist. A more detailed report will be submitted by this task force as a part of our report in June.

TASK FORCE NO. 3—ETHICAL PRACTICES

This task force, under the chairmanship of A. George Mallis, has submitted its tentative report of findings as of this date. The Section Executive Committee wishes to review the report and to confer with the Ethical Practices Committee prior to presentation of the final report in June.

TASK FORCE NO. 4—PROFESSIONAL LIABILITY INSURANCE

Task Force No. 4, under the chairmanship of C. K. Mathews, together with the assistance of the Section Executive Committee and other interested professional engineers, has succeeded in securing the interest of one of the country's large domestic insurance underwriters, the Continental Casualty Company of Chicago, Illinois. The underwriter's agent, Victor O. Schinnerer & Co. of Washington, D. C., in co-operation with NSPE headquarters, has circularized the firms on NSPE's consulting engineers list to ascertain their interest in such policy. Of 670 replying by January 29, 17 per cent now carry protection, 67 per cent wish it and six per cent have admitted claims in the last several years. The form of policy has been reviewed and, in its final form, has been submitted to the necessary statutory agencies throughout the country for filing. It will be offered to professional practitioners who are members of the National Society of Professional Engineers upon approval by this Board. The agent requests designation as agent of record in dealings with Continental Casualty Co. on behalf of this group insurance with and for the NSPE.

Two actions are offered for approval by the Board of Directors:

1. It is recommended that the attached Professional Liability Insurance Policy offered by the Continental Casualty Co. of Chicago, Illinois, be favorably called to the attention of those interested members who are consulting engineers in private practice, this to remain in effect to the will of this Board.

2. It is recommended that NSPE recognize Victor O. Schinner & Co. of Washington, D. C. as agent of record in connection with the policy mentioned in paragraph No. 1 above, said relation remaining in effect at the will of this Board and the agent.

In these actions the Society has brought to fruiton the efforts of many engineers, some of whom have worked consistently for years. Of special significance are Past President Alan G. Stanford, Executive Director Paul Robbins, and Legislative Counsel Milton Lunch. Thanks are due Task Force 4 members C. Kelsey Mathews, Arlow V. Ferry and S. J. Callahan.

SYMPOSIUM AT ANNUAL MEETING

Vice Chairman Harvey F. Pierce has taken the obligation to provide the program. In addition to the discussion of the reports of the several task forces, there will be a panel discussion involving such subjects as professional development opportunities, profit sharing, opportunities for association in ownership position, unionism of employees in private practice and other similar problems.

This program is being worked up co-operatively with the Subcommittee for Engineers-in-the-Employ-of-Private Practitioners.

GENERAL PROGRESS

The Section receives frequent reports of the formation of functional sections for consulting engineers in private practice in both state and chapter areas. We also hear of formation of functional sections for other branches of professional activity, all of which indicate an increasing interest in the added facilities of the National Society of Professional Engineers.

Board Action: Recommendations Approved

ENGINEERS-IN-GOVERNMENT SUBCOMMITTEE

The Engineers-in-Government Subcommittee of the Employment Practices Committee submits herein the following progress report:

At the October, 1956, Board meeting we made a verbal report to the effect that the Committee with the help and advice of the headquarters staff had been studying a Federal salary and classification act which had been submitted to the last Congress. This proposed legislation failed to receive consideration from the Congress prior to adjournment but the study and comments from our Washington staff and committee members were sufficient to persuade the authors of the legislation that the bill which they had submitted was inadequate.

It is our understanding that another bill will be introduced for the consideration of the present Congress but thus far this Committee has not had the opportunity to study it. When such legislation is presented we propose to study it and will endeavor to have incorporated in it appropriate provisions to meet the needs and desires of the professional engineers in Federal service.

The Committee has given consideration to the desirability of the formation of a Functional Section for Engineers-in-Government but does not at this time feel that there has been an adequate expression from that part of the membership which should have a particular interest in such an activity either for or against the formation of the section. We do recommend, however, that the member-ship give thought to this matter.

The Committee is participating in the planning of the program for the Dallas meeting in June and will participate in that part of the program devoted to the young engineer in government.

The Committee is of the opinion that it already possesses the authority to proceed with such action as may be necessary on behalf of the membership on any matters pertaining to pending or forthcoming legislation. We, therefore, recommend that this report be received.

SUPPLEMENT

Since our report was prepared, the revised Moss-Gubser Bill has been introduced and has received the careful study of the Subcommittee members. As may be expected in a 46-page bill of considerable complexity, a number of significant points have been raised. Many of these points deal with the positions to be covered in the proposed Scientific and Professional Schedule. The new bill is considerably better with respect to coverage of engineering positions than last year's bill. However, several engineering classifications are not included. There has been established close and cordial relations with the staff members of the House Civil Service Committee on this bill, and we feel that these questions can be resolved to our satisfaction through conference with them. We suggest that this type of detail can best be handled by the Subcommittee, in cooperation with the Washington office.

The proposed new salary grades (from $5,070 for SPS-1 to $19,000 for SPS-14) appear to meet with general approval, and we think it would damage our case to ask for higher rates than those proposed. They are considerably better than the present salary grades applicable to engineers and scientists. The conversion table in the proposed bill would bring engineers covered by the bill into the new professional schedule without any reduction in grade in any case.

Several members of the Subcommittee have suggested the inclusion of a new provision to require registration for SPS-3 and above (present grade GS-7). NSPE policy now calls for registration as a requirement for those promoted or appointed to GS-13 and above, which under the new system would be SPS-9. Although we all strongly favor a registration requirement for Federally-employed engineers at an appropriate level, this is a very difficult point to resolve in terms of the pending bill. If we make a strong recommendation for a registration requirement, we will definitely have strong opposition from many engineers in the Federal service (who are not registered, but who may be influential), and we will probably have very strong opposition from the Civil Service Commission and the official spokesmen of various Government agencies. We should balance our desire for a registration requirement against the adverse influence it may have in terms of passage of the bill. Likewise, we should be aware of the practical possibility that NSPE may be blamed for defeat of the bill (if it does not pass) by those opposed to registration as a mandatory requirement. Offsetting this situation is the feeling on the part of many of us that we will never get a registration requirement if we do not make the move when the time is ripe. We cannot procrastinate forever on this issue.

Having presented both sides of this question for your consideration, it is our suggestion that the Board grant the Subcommittee leeway and discretion to handle this point in a manner deemed most likely of good results, depending on the practical and political situation prevailing when testimony is presented.

To bring these comments on various points to a head for discussion and action, we offer the following recommendations:

1. NSPE endorses and supports the so-called "Moss-Gubser Bill" (H. R. 2803, 2804) proposing the re-establishment of a professional schedule for professional engineers and other professional employees of the Federal Government.

2. The Engineer-in-Government Subcommittee is authorized to confer with the sponsors of the legislation and staff members of the House Civil Service Committee, and to propose on behalf of NSPE such revisions and additions to the list of employees to be covered by the professional schedule as may seem to the Subcommittee to be most equitable to the Government and the engineering profession.

3. The Engineer-in-Government Subcommittee is authorized to confer with the sponsors of the legislation in the House Civil Service Committee on the inclusion of a suitable registration clause in the bill. In presenting this recommendation, the Subcommittee desires authority to determine the degree to which the registration requirement should be insisted upon, dependent upon its evaluation of the degree, if any, which such a recommendation might have on the passage of the bill.

Board Action: Recommendations Approved

ENGINEERS-IN-EDUCATION SUBCOMMITTEE

One of the responsibilities of the Subcommittee has been that of giving consideration to a study of salary statistics as they apply to engineering teachers. In this connection we have been awaiting the publication, expected momentarily, of the results of a survey conducted by the Special Surveys Committee of Engineers Joint Council. This survey will provide information on the earnings of engineers in education compared to those in industry and government. Contact has been maintained with the EJC Committee and judging from the kind of information they are compiling, the Subcommittee is of the opinion that NSPE should not consider preparation of a questionnaire for conducting a survey of its own until the above mentioned survey is reported and there is opportunity to study the findings. It may well be that our purpose will have been served to a considerable degree. In addition to obtaining salary statistics on engineers in industry and government through suitable questionnaires, the EJC survey seeks answers to the questions from individual engineering faculty members. Replies are being treated with strict confidence and only summary data will be utilized.

It is expected that the EJC report will present the faculty data in a very condensed form which will be of limited value to educational institutions. The raw data will be given to a committee of the ASEE which will prepare a detailed analysis expressly for the guidance of the colleges.

Plans are progressing in connection with the conference of the Professional Development of the Young Engineer in Education to be held on June 7, 1957, at the time of the annual meeting of NSPE in Dallas, Texas. Sessions of the conference will be held both morning and afternoon, utilizing invited speakers and question and discussion periods. There will be simultaneous conferences on the young engineer in industry, private practice, and government. A combined luncheon, which will be a part of each of these conferences, will be addressed by a nationally-known speaker on the general theme of young engineers.

Our Subcommittee was represented at the meeting of the Engineers-in-Industry Subcommittee on December 1-2, 1956, in Washington, D. C., in the person of George W. Clark. He reports the meeting was "very fruitful and altogether worth while." Through him, our Committee has offered to help in the study of formation of student chapters and provision for national student membership and chapter affiliation.

Board Action: Report Received

ENGINEERS-IN-INDUSTRY SUBCOMMITTEE

RECOMMENDED FOR BOARD ACTION

1. It is very possible that Congress will hold further hearings on proposed amendment of the Taft-Hartley Act this year. Based on past Board action, NSPE will testify in support of retaining the present professional provisions and in favor of adopting the Kearns Bill "Freedom of Association" amendment.

Further, it is recommended that several additional NSPE policies be adopted which are pertinent to the interests of professional engineers:

a. The present decertification provision, which gives employees the right to vote for a discontinuance of union representation, should be retained in the Act.

b. If the present court case in which NSPE is engaged (Westinghouse-Jersey City Case) does not result in a ruling that the present decertification provision gives professional employees the right to a separate vote when represented by heterogeneous unions the Act should be amended to clarify such right for professional employees.

c. If the present court cases in which NSPE is engaged (Westinghouse-Jersey City and Buffalo) do not result in a ruling that certification and decertification decisions by the NLRB are reviewable by courts of appropriate jurisdiction the Act should be amended to provide such right of court review when it is alleged that the NLRB has violated the provisions of the Act granting professional employees separate rights.

2. It is recommended that NSPE materials and programs on industrial relations problems of employed engineers be offered to officers and leaders of local technical society sections and other groups, through the local NSPE chapters.

3. It is recommended that NSPE inaugurate a $2.00 a year subscription charge for the Employment Practices Newsletter to profit-making organizations and when over ten subscriptions are mailed to one address. (NSPE should continue to make free distribution to requesting members and to non-profit organizations whether handled in bulk or addressed to individuals.)

STATUS OF COURT CASES

Westinghouse-Jersey City—This is the case which tests the question whether professional employees are entitled to a separate vote on a decertification election when represented by a trade union. NSPE is participating in this case to support the principle of a separate professional vote. After the case had been argued before the Court, an independent union filed a petition for a representation election among certain employees, including the engineers involved in the decertification suit. A certification election was held and the engineers, who were given a separate vote because it was a certification election, voted unanimously for "no union." This intervening event, in effect, gave the engineers the relief sought by their NSPE-supported suit. However, it did not establish the legal principle which is our prime concern. The NLRB is now seeking to have the original suit dismissed because of this event, without a court decision on the merits. NSPE is opposing this move and is supporting a request for a court decision on the merits to establish the principle involved.

Westinghouse-Buffalo—This case tests the question whether the NLRB may include some nonprofessional employees with professional employees in the voting unit on a certification election. NSPE has participated as a "friend of the court." The U. S. District Court has decided in favor of the position taken by NSPE and ordered a new election confined to professional employees. The NLRB has appealed this decision and NSPE will continue its "friend of the court" role by filing a brief in the United States Court of Appeals. This case, as well as the Jersey City case, is significant on the question of the Court's jurisdiction to rule on NLRB decisions in certification elections. The NLRB denies such authority for court review. The District Court found that it did have jurisdiction to review the NLRB determination when the NLRB had violated the limitations of the Act.

PUBLIC RELATIONS ASPECTS OF COURT CASES

The fact that NSPE has undertaken to fight for the rights of professional engineer employees through these cases should be made known to the membership and to all professional engineers. These examples of NSPE action on behalf of the profession should be noted in state and chapter publications and through other media. At an appropriate time it is planned to carry a comprehensive story in the AMERICAN ENGINEER detailing the NSPE activity in this respect and the significance and implications to the profession of the questions involved.

CRITERIA FOR PROFESSIONAL EMPLOYMENT OF ENGINEERS

More than 12,000 copies of the *Criteria* have been distributed to engineering seniors through deans of engineering schools. The Board of Directors will recall that the distribution was authorized in the hope that the graduating seniors could avail themselves of this guide in selecting their first employment. It is the plan of the Subcommittee to repeat the distribution each year because of the enthusiasm expressed by many of the deans.

About 15,000 copies have been distributed to interested NSPE members, to firms, and to other individuals not members of NSPE. Approximate cash realized by sale ($1,400) will pay for the distribution to engineering schools.

NSPE STUDENT CHAPTERS AND STUDENT MEMBERSHIP

The Subcommittee has been encouraged by the interest and similar commendation by the other subcommittees of the Employment Practices Committee and by the Young Engineers Committee for NSPE to formulate an NSPE related student program in the engineering schools. This common interest continues to be coordinated between the committees and it is hoped a program or plan can soon be presented which will be useful and acceptable to the membership.

ENGINEERING EMPLOYMENT PRACTICES NEWSLETTER

It has been found that the subscription list is growing at a rapid rate and that the Society faces a problem of selection between general or selective distribution. The Subcommittee did not feel that distribution should be restricted, but that bulk orders might be better financed at $2.00 per annual subscription to profit making organization. This modest fee would pay some of the cost of producing, handling, and mailing, but would not discourage the use of this public relations and informational piece. No charge will be levied on members or non-profit institutions, libraries, or individuals who request the publication.

Distribution has risen to about 5,000 subscriptions.

ENGINEER IN INDUSTRY FUNCTIONAL SECTIONS

It is recognized that several state societies and chapter affiliates already have Engineer-in-Industry Functional Sections or their equivalent. This Subcommittee recognizes that the organization format and degree of effectiveness differs from group to group and has a continuing item on the agenda of the study of such sections.

ENGINEER EMPLOYEE PROBLEMS

The Subcommittee has studied the certification proceedings at Texas Company, Westville, N. J., and has been informed that the New Jersey Society of Professional Engineers has offered to co-operate with the engineers and the management of this plant to develop a professional approach to the problems.

A desirable step to be encouraged at this point would be to encourage registration and affiliation with the New Jersey Society of Professional Engineers of all engineering employees.

The need for NSPE assistance in the solution of particular engineer employee-employer problems becomes more and more apparent. The Subcommittee has for future meeting agenda a full discussion of possible areas and methods of handling problems of the employed engineer and his employer.

Case histories of some of the problems will be anonymously presented at a later date for publication and use by chapter committees in their attempts to guide local employment practices.

Further, it has been recognized that most nonmembers and many members of NSPE do not know of the many services already available through NSPE. They do not know of the many problems that have been met by NSPE and their possible solutions. They are not prepared when they, themselves, later face similar problems.

Board Action: Recommendations Approved

ENGINEERS-IN-EMPLOY-OF-PRIVATE PRACTITIONERS SUBCOMMITTEE

RECOMMENDED FOR BOARD ACTION

It is recommended that the Board of Directors authorize the publication and distribution of the *Report of Survey of Engineers Employed by Private Practitioners*, with the provision that this Report first be reviewed and approved by the Executive Committee. The estimated cost for 2,000 copies of this 22-page booklet is $350, provided work is done by the headquarters' office.

PLANS FOR FUTURE COMMITTEE ACTIVITY

1. Investigate unionism among consultants.
2. Study the relationship of interests of subprofessional employees to the interests of professional engineers employed by private practitioners.
3. Make a study of the professional attitudes of recently graduated engineers with a view toward determining what must be done to develop professionalism among employees of consultants.
4. Develop a suggested program for the self-improvement of the professional engineer who is employed by the consultant.
5. Assist in the compilation of a current file containing the names of consultants.

Board Action: Recommendation Approved

AD HOC COMMITTEE ON FEDERAL LEGISLATION FOR ENGINEERING EDUCATION

PREFACE

In reading the report that follows, one should keep in mind the scope of *the Committee's responsibility—the recommending of policies to guide the National Society of Professional Engineers regarding legislation affecting engineering education.* The Committee excluded but did not overlook items of major importance to the nation's well-being since they were not a part of the Committee's task.

The goal of this committee report is to provide guidance that will contribute to the most productive use of funds which may be spent by the Federal Government in any manner that affects engineering education.

This report recommends that the National Society of Professional Engineers adopt the following guiding principles for the evaluation of proposed federal actions affecting engineering education:

> The committee believes that it is the responsibility of the local community to provide educational opportunity for the children of that area. The committee also believes that legislation can be enacted which will stimulate and assist local communities in discharging that obligation.
>
> NSPE endorses legislation by the Congress that will improve the ability of all educational organizations (primary, secondary, and college) to attract and hold superior men and women in education positions.
>
> NSPE endorses legislation by the Congress that will result in the *stimulation* of high school students (particularly in the upper twenty-five per cent of the graduates) to continue their education beyond high school.
>
> NSPE endorses legislation that will stimulate the expansion of technical institute educational programs where the courses are at the post high school level.
>
> NSPE favors federal assistance to engineering and science students of proven ability to enable them to pursue graduate work.
>
> NSPE opposes legislation that will provide direct financial support from Federal funds for students who have not completed their educational program to the bachelor's degree.

INTRODUCTION

The Committee on Federal Legislation for Engineering Education was established to enable the Society to be of maximum assistance to the Congress in its study of the availability of scientists and engineers. Even though it can easily be established that there are many engineering positions open that are not being filled—"the shortage of engineers has become a controversial subject."

ENGINEERING ENROLLMENT

Whatever may be today's supply of, and demand for engineers, the changes in the supply during the next four years must depend upon enrollments now. The number of men and women who will be educated as engineers in the next four years is relatively a fixed quantity determined by the number of students attending engineering colleges today . . . there are *more students in engineering colleges today than have been enrolled at any other time* in the history of this nation.

Present enrollments justify the belief that there will be 150,000 engineers graduated during the next four years and that the rate of graduation per year in 1960 will be over 45,000. In the four-year period ending in 1956, 95,300 engineers were graduated, 26,300 of whom received their degrees in 1956.

The Committee has made no attempt to evaluate numerous estimates regarding the number of engineers required by our nation. The majority of available estimates are of the order of 50,000 per year. Regardless of what may be the need, thoughtful consideration should be given to any action that would increase the enrollment in engineering courses since educational institutions find it difficult to provide satisfactory instruction for those already enrolled. Enrollments now and enrollment trends will probably provide an adequate number of engineering graduates.

Two alternatives are open to alleviate any serious shortages that exist now—one, the training of engineering technicians who can release engineers from routine tasks and two, the increasing of graduate enrollment which can add significantly to the total competence of engineering manpower. With one year of graduate study the technical competence of the engineer is increased by about fifty per cent. The previous statement is based upon the fact that about half of the four-year undergraduate program is made up of engineering subjects.

FINANCIAL AID TO STUDENTS

The aids given students by the National Science Foundation Fellowship Program as well as the fellowship plans supported by some agencies of the Federal Government and many industrial organizations are steps in the right direction. Their effectiveness in keeping students in colleges and universities is hampered, however, by a lack of extensive distribution of information concerning these programs.

Research for governmental agencies at educational institutions is also increasing the number of graduate students because it offers them opportunities to earn a portion of their expenses. Tax deductions permitted for families supporting students in the graduate school would help stimulate additional graduate work.

LONG RANGE FACTORS IN ENGINEERING MANPOWER

The quality and the quantity of engineering services that are and will be available to this nation are influenced by the nature of the primary and secondary school programs. Since the attitude of the public is one of the most powerful factors in the formulation of educational policies and practices in a community, an educationally informed population is a necessity.

Recent information indicates that sixty per cent of the 72,800 freshmen engineers in engineering colleges of the U.S. in 1955 were required to take non-credit or preparatory mathematics before they could enroll in regular college courses. This usually means an additional semester in college for the student to earn a degree. On the basis of an average cost of $600 per semester for the student, this lack of adequate preparation costs these students and their parents twenty-six million dollars. This does not include the costs to the institution of providing instruction for courses that should have been taken in high school. Public opinion is a major factor in determining quality of the nation's educational program.

Providing instruction to correct these deficiencies is not a simple matter. In primary and secondary schools where it is the policy to determine salary rates for teachers without regard to fields of specialization it generally means that students are either denied the opportunity to study mathematics and science or forced to accept instruction in the subjects from teachers of comparatively less competence than in other subjects. *It should be the practice of school officials to adopt salary policies that assure students not only of the opportunity to study mathematics and science but also of instruction in these subjects that is on a par with other instruction.* Where schools follow a salary policy based primarily upon years of tenure and college training, they force students to accept less competent instruction in some fields than others.

STIMULATION AND PREPARATION OF HIGH SCHOOL STUDENTS

The importance of the teacher in the grade school and in the high school to adequate technical preparation of students for post high school education has been discussed. Probably of equal and possibly of greater importance is the teacher's role in stimulating the ambitions of the student. In the October 20, 1956 issue of the *Saturday Evening Post*, Charles F. Kettering says, "When a man's life has been a great and wondrous adventure he often looks back in search of the turning point—that single moment which opened the door to his great adventure. For me that moment came more than 60 years ago, in a small

Ohio school house, when an enthusiastic country school teacher awoke in me a burning interest in the fascinating world of science. He ignited a spark that led me to a wonderful and rewarding career in automotive engineering and basic scientific research and now in the battle against cancer."

Students who are capable of following engineering careers can be stimulated, encouraged, and challenged by teachers who are interested in and educated in science and mathematics. It is important that employment conditions in the schools attract such teachers if an adequate supply of capable, well-trained technicians and engineers is to be available in the U.S. We must attract and retain teachers who prepare the students technically and stimulate their interest in further education.

In *Tomorrow's Scientists and Engineers*, a publication of NAM, on page seven the following information is quoted. "According to a recent survey of professions, it is found that the average income of a dentist is 2½ times that of a teacher, the lawyer 2-7/10 times, and the physician 4-2/10 times as much." These low salary rates not only discourage many able, interested young people from entering the teaching profession but it probably influences some of the more able high school students to terminate their education with high school graduation. Some must question the advisability of continuing their education four more years to prepare themselves for positions offering salaries roughly equal to the earnings of high school graduates.

Funds to increase the salaries of teachers so that our young people will have the best instruction should be aggressively sought by everyone. It is insurance not only of security but also of economic well-being.

TECHNICIAN EDUCATION

Technical institutes can play an important part in relieving a shortage of engineers. They have been in operation in this country for many years.

A technician is possessed of a technical background at the college level and has been trained to perform services such as those of an engineering aide or assistant, a technical specialist, a technical salesman, or a production supervisor or foreman. It should be recognized that the technical institute student differs from the engineering student probably more in his interests than in his native ability.

The need for technicians in our industrial system was recognized by the Engineers Council for Professional Development in 1944 when an accreditation program was established. With the trend in engineering education on toward the science of engineering (emphasis on fundamental priciples) and away from the art of engineering (instructional emphasis on applications and techniques to solve specific problems), technical institute education becomes of increasing importance.

This trend in engineering education is best demonstrated by the adoption of the Evaluation of Engineering Education Report, usually called the Grinter Report, by the ASEE in 1955.

> "Engineering Education must contribute to the development of men who can face new and difficult engineering situations with imagination and competence. Meeting such situations invariably involves both professional and social responsibilities. The Committee considers that scientifically oriented engineering curricula are essential to achieve these ends."

According to a survey made by the Committee of Engineers Joint Council, with the assistance of staff of the Engineering Manpower Commission, the ratio of technicians to engineers in terms of new hires for 1956 show the ratio to be over 1.00. Thus the demands for technicians can be considered comparable to the demands for engineering graduates. And the trend is toward employing more and more technicians to relieve the engineer of noncreative duties. Technician functions are rapidly becoming identified by industry.

Many able people are not continuing their education beyond the high school . . . of 74,000 boys with high intelligence scores who graduated from high school only 48,000 entered college and of that number only 42,000 were graduated . . . and even a greater loss among girls in the same group. Of 74,000 only 32,000 entered college and of that number 28,000 were graduated.

In order to encourage this potential supply of manpower to aid in relieving the engineering shortage additional technical institutes should be established in close liaison with engineering colleges.

For those departments of the Federal Government requiring personnel with technical training careful consideration should be given to long-term contracts for technician training with educational organizations that can provide this service.

One way to provide more engineering manpower in specific fields is to supplement the work of the engineer with technician assistance. This assistance can be trained in half the time that it takes to train the engineer.

Of the two problems—financing the student and providing adequate instruction—the latter represents a more critical factor in guaranteeing adequate engineering talent to the nation. Financing undergraduate students from Federal funds would put emphasis on need for more students when enrollments in the U.S. are at an all time high and are still growing rapidly. The critical need is college staff and facilities.

SUMMARY

The Committee suggests that conclusions regarding action to be taken relative to shortages of engineers be based not only on the situation at present but on the trends that are in evidence. The available supply of engineers to industry cannot be materially influenced by legislation affecting enrollment in less than four years. Major consideration should be given to increasing the number of outstanding students who are educated beyond the bachelor's degree.

Some areas of critical shortages of engineers can be alleviated by on-the-job graduate study. Technician training can provide comparatively earlier trained manpower to relieve engineers of routine duties.

The evidence before the Committee clearly indicates that there are fewer teachers of science and mathematics particularly in the high schools than there are positions open, that many outstanding students do not continue their education beyond the high school level, and that others terminate their education with the bachelor's degree.

The Committee urges that more careful consideration be given to the education of the most capable students because we are dependent on them for both our security and our economic well-being.

The Committee considers the maintenance of adequate instruction the principal problem of providing the nation with engineering manpower. This situation naturally involves teachers. It is an accepted fact that the annual income of teachers of science and mathematics is not sufficient to attract and hold the most capable people.

Teachers are among the most productive members of our society measured both in their contribution to our economic system and to our form of social order.

The Committee believes that additional funds are necessary to provide the quality of education that is the nation's best interest. Money alone, however, will not improve our educational program. Making teaching positions worthwhile to capable people as well as the careful management of funds for education is essential.

The Committee realizes that the key to increased effectiveness of the educational program is the attitude of the public.

CLOSING COMMENTS, SUGGESTIONS AND POSSIBLE ACTIONS

Many forms of action to accomplish the objectives found in the Recommended Guiding Principles of this report are possible. However, the preparation of specific types of legislation is not feasible for the Ad Hoc Committee. Some objectives can be accomplished by action other than legislative.

It is recommended that the departments of the Federal Government requiring research give careful study to contracts with educational institutions. These contracts would increase the number of graduate students and assist institutions of higher learning in attracting and holding able staff.

Board Action: Recommendations Approved

ENGINEERING PRACTICES

In the last week of January, the Engineering Practices Committee received a memorandum from Executive Director Robbins in which he set forth the BUREAU OF PUBLIC ROADS' POLICY ON EMPLOYMENT OF ENGINEERS BY CONSULTANTS as extracted from a Bureau of Public Roads' memorandum to division and district engineers, dated December 28, 1956, as follows:

> "To afford State highway departments the maximum of opportunity to develop and retain adequate engineering staffs, it is recommended that the following clause be made a part of such agreements for engineering services, and an appropriate amendment is being made in the Outline of Provision and Clauses for Engineering Contracts attached to PPM 40-6:
>
> 'The consultant shall not engage on a full-or part-time or other basis during the period of the contract, any professional or technical personnel who are or have been at any time during the period of the contract in the employ of the Bureau of Public Roads or the highway organization of any State, county, or city, except regularly retired employees, without the written consent of the public employer of such person.'
>
> "It is expected that the Bureau of Public Roads and the State

county, or city will not give its consent under the above suggested clause to permit the consultant to engage the services of any of its professional or technical employees, if such consent would in any way impair the adequacy of the highway organization or effectiveness of highway operations of such organization."

A copy of this was mailed to each member of the Engineering Practices Committee for comment and, since this is of direct concern to the consultants, the Functional Section for Engineers in Private Practice was invited to make its recommendations.

It can be readily appreciated that this is a matter of pressing importance to a great number of engineers—both self-employed and employed—particularly in view of the new hundred billion dollar Federal Highway Act. We have been advised that the state highway departments are requiring the inclusion of the quoted clause in contracts with consulting engineers under the new Highway Act. It is understood this will prohibit a consulting firm from engaging any engineering employees who were employed by a state, county or city highway organization at the time the contract was executed and thereafter for the duration of the contract for any type of work for the consulting firm.

Furthermore, under this clause apparently a consulting firm holding a contract under the Highway Act could not employ an engineer for any type of work even though completely unrelated to highway design or operations although the employee may have voluntarily resigned from his previous highway department job and approached the consulting firm on his own initiative. It would be pointed out too that although this restriction applies only to the period of the contract that this period may be lengthy, and there may be consecutive contracts which will extend the period of prohibition.

The Engineering Practices Committee and the Executive Committee of the Functional Section for Engineers in Private Practice met jointly to discuss this problem. Both were sympathetic to the problem the Bureau of Public Roads and other highway organizations face in the raiding of state, county and city highway organizations for scarce engineering personnel; however, it is felt that this policy will not only adversely affect the consultants but will be detrimental to the highway program as well because:

1. The basic cause of the difficulties the Bureau contemplates is the salary differential between State Highway employees and the employees in industry and private practice. This must be corrected if the highway program is to move effectively.

2. The policy as stated will have the effect of freezing highway department employees to their jobs or forcing them out of the highway program entirely. The end result of this policy will be to cause dissatisfaction of these employees with accompanying inefficiency and increased cost of the highway program due to employment unrest and change over.

3. This policy will have the further effect of discouraging young engineers and engineering graduates in accepting positions with the highway departments, not only because of low salaries but also because of the liability of this freezing to the job.

4. This policy will also greatly increase the possibility of unionization which will be detrimental not only to the highway departments but also to the consultants.

RECOMMENDATION:

It is recommended that:

1. NSPE oppose the inclusion of this clause in Engineering Contracts because the end results will be highly detrimental to the Highway Program.

2. NSPE offer its services to the Bureau of Public Roads in order to jointly arrive at a solution which will be mutually satisfactory.

However, we believe it should be emphasized that the basic problem is in the salary scale. A revision of this factor would decrease the cost of this program by providing continuing employment of present highly trained engineering personnel and through this incentive provide a larger market among the young engineer graduates.

Board Action: Report Approved

ENGINEERING PREPARATION

In order to improve the quality and professional caliber of scientists and engineers needed for the defense and for the peaceful development of our country, it is necessary to provide motivation, stimulation and direction to young people in their grade school and high school age. Preparation for a career in engineering or science must be planned when a student enters high school, so that he or she may choose the curriculum best adapted for the future work in the field chosen. Furthermore, selection of talented students should be made at an early age to make it possible to provide instruction for them. The most effective inspiration and direction of young people is that provided by good school teachers.

The problems to be faced are as follows:

(1) To attract better teachers of mathematics and science to our schools.

(2) To aid the teachers already in this service in various ways.

(3) To supply information, guidance and advice to young people and their parents regarding the choice of a career, and to provide activities for young people which would inspire them, stimulate their imagination, and guide them to undertake the preparation needed for a career in science or engineering.

(4) To emphasize quality, not numbers.

There is a large number of organizations now engaged in the studies and various attempts to provide an increased supply of engineers and scientists and to improve the quality and ability of our graduating students. Many large industries, as well as numerous non-profit organizations, are participating in this work. It is the unanimous opinion of your Committee that the major function of NSPE is to support the best programs and to cooperate in execution at the local level of the programs which appear most appropriate to the chapter areas.

Such work can in general be divided into two groups:

A. Making the position of mathematics or science teacher on the grade or high school level more remunerative and more dignified, and improving the effectiveness of teaching at these levels. This is regarded the most important part of the program.

B. Motivating the young people by enlightened selection and guidance and by superior instruction at the grade level and at the high school level to stimulate students and provide them proper fundamentals for the study of mathematics and science in college.

A. *What Can Be Done On The Local Level In Order To Make The Teaching Of Mathematics And Science More Attractive And More Effective*

1. *Increasing Teachers Income*

(a) Salary Scale

While it must be recognized that the present salary scales for teachers in grade schools and high schools are inadequate in most communities in the United States, the lack of adequate compensation has the greatest impact on the teaching of mathematics and science. Many of the young people, men and women, who are trained in mathematics and science, can find far better pay available in industry than in teaching.

The present laws in most of the states provide that the salaries of public school teachers in a given school district can be governed by two factors only, namely, the number of years of college study and the number of years of teaching experience of the individual teacher. No differentiation is allowed on the basis of the subject taught or the grade at which teaching is done. While it is felt in some quarters that a separate salary guide should be provided for those fields in which competitive industrial salaries are high, namely, in the fields of mathematics and science, the Committee does not feel that this is an appropriate time for NSPE to engage in legislative activities favoring such salary differentiation. Far more effective work can be done now in other areas.

(b) Upgrading Through Additional College Work

Increase in compensation of teachers can be accomplished through the vehicle of additional work in college leading to advanced degrees. A new concept must be adopted in this connection, namely, *increased pay must go with increased competence in teaching*. Some of the teachers in mathematics and science have not had enough college study of the subject matter they are teaching. Some others have not kept up to date with the present changes in subject matter and concepts. The effectiveness of such teachers could be increased by college courses in mathematics or science. However, many of these teachers are not qualified to enroll for postgraduate work in mathematics or science without some preliminary undergraduate courses—and undergraduate courses are generally not accepted for credit toward advanced degrees. Since the increase in the compensation of the teacher depends on his (or her) earning an advanced degree, the teacher feels compelled to enroll on the graduate level. Usually, this means more and more courses in teaching methods, when the need is for courses in subject matter.

In order to increase the teacher's competence in the subject matter, it may be necessary to have the credit rules changed so as to provide in the salary guide equivalent credit for undergraduate courses in mathematics and science. This can be accomplished only on the local level with the education committees of the chapters and states working with the local boards of education and with legislatures to improve the teaching of mathematics and science.

A middle ground might be found in specifying the minimum number of credits in mathematics or science which must be taken by teachers in these subjects in order to qualify for advanced standing. It may also be noted that some colleges

offer courses in modern mathematics which can be qualified as graduate courses.

(c) Summer Institute Fellowships

A number of agencies have made arrangements to assist teachers to take advanced work in mathematics or science during the summer at no loss of income. Some of our major industries have made provisions whereby they send high school teachers to a summer institute for a period of six weeks and pay all their expenses. The National Science Foundation is expanding its program to pay tuition expenses and a stipend to compensate the teacher attending summer institute for loss of earning capacity, such stipend depending on the number of dependents. Information regarding such summer institutes, the methods of applying for admission and, where necessary, other assistance to permit local teachers to avail themselves of the opportunity to attend an institute, can be a part of the work of a local educational committee.

(d) Summer Employment by Industry

Support by industry in providing summer work to increase the teacher's annual income does not appear to be promising. In the first place, industry tends to fill summer vacancies with college teachers rather than grade school or high school teachers. Secondly, the total number of summer vacancies is relatively low, since it takes some time and effort to train a new person on a summer job, which is particularly difficult during the two months vacation period of public schools.

2. *Working Conditions of Teachers*

The National Education Association has indicated that according to many teachers of science, it is not the salary but the working conditions which make their work very difficult. In order to keep up to date on the new current developments, a science teacher must have time out of school collecting materials, attending scientific meetings. A science teacher needs time to set up his laboratory experiments. He should not be given jobs in home room, patrolling, or coaching. He should not be assigned a teaching schedule of five or six hours a day.

Thus, one of the things that must be considered in each locality is the work load assigned to science teachers.

3. *Women Teachers*

According to the statistics assembled by the American Association for the Advancement of Science, approximately three-quarters of all high school teachers are women. Judging by present conditions, the majority of the teachers will have to be women. The question arises: "What can be done to help them become better teachers in mathematics and science?"

4. *Retired Engineers and Officers of Military Services*

One of the major drawbacks to the employment of retired engineers and officers from military service as teachers in mathematics or science, appears to be the method of certification of teachers in grade schools and high schools. The rules for certification in most states require that a teacher obtain a number of credits in the so-called "professional" courses on methods of teaching. Mature professional men should be well able to handle high school classes in mathematics and science without having to take the required number of courses on teaching method, designed primarily for young teachers fresh out of college.

While mature men and women with excellent background in the subject matter of mathematics and science cannot obtain teaching certificates because they lack the required number of courses in teaching methods, teachers are assigned to mathematics and science courses without adequate training in the subject matter. Furthermore, there is often no standard as to the minimum work in mathematics a teacher should have in his college work to qualify as a teacher of mathematics in high school. This issue is very important, for, should Congress pass any legislation intended to assist and to improve the compensation of teachers of mathematics and science, there must be a standard to determine who is a qualified teacher of mathematics or science in grade school or high school.

5. *Science Counsellors*

The American Association for the Advancement of Science under its Science Teaching Improvement Program, has made grants to the universities of Oregon, Texas and Nebraska and to Pennsylvania State University for a study on the use of science counsellors. It is proposed that two experienced high school teachers be attached to the science and mathematics staffs of each university to consult with teachers in high schools who request their advice. It is thought that one good counsellor could increase the quality and improve the instruction offered by at least thirty less well prepared teachers.

B. *Motivation of Young People*

1. *Homogeneous Grouping of Able Students In Mathematics And Science*

Surveys reported by the American Association for the Advancement of Science show that nearly one-half of the students who have entered college in engineering or science have indicated that their choice was the result of inspiration by a capable and interested high school teacher. About 20 per cent more indicated that their interest was aroused at home.

Able children become bored in classes in which their abilities are not challenged to the fullest extent. Such challenge can be provided only by a good teacher who is not being held back by slow or indifferent, uninterested students.

According to some authorities, most successful results, indeed the only satisfying results, of providing adequately for the needs of able children, flow from bringing enough of these children together in a group.

Fringe training, "teaching to live," has been given too much prominence, and has taken away from teaching basic subject matter.

2. *Vocational Guidance Pamphlets And Materials*

The American Association for the Advancement of Science has indicated that 164 agencies are now sending out career pamphlets to students and teachers in secondary schools. Some groups feel that this program is not very effective. The very multiplicity of the material may be self-deceiving.

Undoubtedly, some type of pamphlets distributed may be more effective in one area, some pamphlets in another. It would seem most desirable for a chapter to investigate the type of pamphlets available and to determine which ones would be most effective to interest young people in their area.

3. *High School Clubs In Mathematics and Science*

A number of high schools have active clubs in mathematics and science. Some of these clubs are organized in national groups, such as Future Engineers of America, JETS (Junior Engineering Training School). High school students and groups of students also participate in the science fairs.

The establishment of a mathematics or science club in a high school serves several valuable purposes in stimulating the latent ability of future engineers and scientists. Because of its state and county organization, the NSPE is unusually well suited to assist in the formation and encouragement of school science clubs. The engineer (or engineers) acting as advisers to such a club have a stimulating and rewarding experience.

The Committee plans to prepare a chapter guide for the organization and operation of high school science clubs.

RECOMMENDATIONS

1. Ask each state society and each chapter to refer the problem to state and chapter education committees, and to suggest that chapters devote at least one meeting a year to open discussion and review of the work done and of new suggestions for the improvement in the teaching of mathematics and science in grade and secondary schools.
2. Authorize the NSPE Committee on Engineering Preparation to supply such state and chapter committees information on the various facets of the problem, on other organizations working in this area, and on the literature available. State and chapter committees would thus be assisted to become local centers which could create interest and obtain support of civic and other organizations in the community to promote better education in mathematics and sciences.
3. Make available staff facilities to the NSPE Engineering Preparation Committee to enable it to maintain contact with state and chapter committees, to supply them data they request, to supply them information on activities of other organizations, and to gather data on the problems found in various communities and means to solve them where the problem has been successfully met.

Board Action: Recommendations 1 and 2 Approved; 3 Referred to Executive Committee

COMMITTEE ON LIASION WITH ENGINEERS JOINT COUNCIL

This Committee was instituted some four years ago to handle matters of mutual interest with EJC. As no meeting with representatives of the Council have been held since your current committee was appointed, this report will confine itself to a factual report on the organization and some of the activities of EJC for the information of the NSPE Board:

ORGANIZATION. As the name implies this is a confederation of societies. It was formed in 1941 and a Constitution was adopted in 1952. There are no individual members. To qualify for membership a society must meet the following qualifications:

(a) The corporate or voting membership shall be confined to individual members.

(b) A majority of individual members shall be either engineering graduates of colleges of recognized standing or shall be licensed or registered by state board of registration for professional engineers.

(c) Have a total membership of at least 5,000 individual members of which the majority must meet the above requirements.

(d) Receive the affirmative vote of not less than two-thirds of the constituent societies of Council.

At the present time the Council is composed of:

American Society of Civil Engineers; American Institute of Mining, Metallurgical & Petroleum Engineers; American Society of Mechanical Engineers; American Water Works Association; American Institute of Electrical Engineers; The Society of Naval Architects and Marine Engineers; American Society for Engineering Education; The American Society of Refrigerating Engineers; American Institute of Chemical Engineers; American Society of Heating and Air Conditioning Engineers; Society of American Military Engineers.

Associate Societies are: American Society of Agricultural Engineers; American Institute of Industrial Engineers; American Institute of Consulting Engineers.

Affiliate Societies are: Kentucky Society of Professional Engineers; Los Angeles Council of Engineering Societies.

The Associate Societies have less than 5,000 members. Affiliates are regional engineering societies or federations of engineering societies. We receive copies of the minutes of their board of directors meetings. Work is carried on by the board with usually 15 to 20 votes involved.

OBJECTIVES are:

(a) To advance the general welfare of mankind through the available resources and creative ability of the engineering profession.

(b) To promote cooperation among the various branches of the engineering profession.

(c) To advance the science and profession of engineering.

(d) To develop sound public policies respecting national and international affairs wherein the engineering professional can be helpful through the services of the engineering profession.

ACTIVITIES DURING 1956—Some of the major activities were:

Air Pollution—A committee is studying the implications of air pollution as related to public welfare and the responsibilities of the engineering profession thereto.

Atomic Energy Panel—Conducted a five day Nuclear Engineering and Science Congress with an International Atomic Exposition.

Consulting Practice—A "Manual of Practice For Consulting Engineers" is being prepared based on one drafted by ASME.

Employment Conditions—A report entitled "Professional Standards and Employment Conditions" was issued and distributed. This covers such subjects as "Employees Responsibilities," "Managements Responsibilities," etc. etc.

Seminars are being planned in various parts of the country for discussing methods of improving employment conditions.

Engineering Manpower Commission—Promotes effective utilization of engineers in maintaining national health and safety and in the supply of engineers. Surveys on demand for engineers are made annually.

International Relations—Officers and Committee Members attend technical conferences in foreign countries. They participate in the Pan American Federation of Engineering Societies.

Labor Legislation—The Council filed a brief as a friend of the Court in the action between the Buffalo Section Westinghouse Engineers Association, Engineers and Scientists of America vs. National Labor Relations Board. (This was filed some weeks after the NSPE brief.)

National Water Policy Panel—Has drafted a report on developments in the field of national water policy.

Planning Committee—Recommended that the Council:

Organize a public relations program to promote unity among engineering groups; support the professional standing of the engineer; interpret the engineering profession to the public; sell the public on the contributions of engineers to our way of life; assure the engineers of the helpful support and assistance of his employers.

Stimulate interest in engineering among the youth of the country; Promote the affiliation of local, state and regional engineering organizations with Engineers Joint Council; Establish a Washington office to provide continuing liaison with governmental actvities. Provision has been made in the 1957 budget for establishment of a Washington office. Character of services to be provided by the Washington office will probably include:

(1) Legislative activity
(2) Relationship with government agencies
(3) Relationship with non-government agencies
(4) Services to individual members

(Note: On June 16 EJC Directors voted down a proposal to spend $5,000 for interim Washington representation during the fiscal year 1957 pending further consideration.)

Committee on Practice of Engineer has been studying questions involved in the practice of engineering for individuals, partnerships and corporations.

Public Relations—A "News Letter" will be published five times a year and sent to officers and members of Boards and local sections of member societies as well as technical journals and trade publications, covering developments within EJC.

Committee on Recognition of Specialties in Engineering is constituted to show those functional groups which might be considering the formation of new "across-the-board" societies that unification may be achieved under the "umbrella" of EJC or one of its member societies.

Special Surveys Committee—Conducted a survey on demand for engineers and professional income of engineering graduates.

Note: Most of the foregoing information was abstracted from the 1956 Preliminary Annual Report of Engineers Joint Council and the reader is referred to this report for more complete details.

There is a plan under consideration to bring Engineers Council for Professional Development into Engineers Joint Council.

There is a proposal that there be an EJC—American Institute of Architect's Committee and NSPE has been invited to furnish a member. The invitation implies that this committee would supplant and make unnecessary the NSPE-AIA activities carried on by the NSPE Committee on Interprofessional Relations.

Finances—Total budgeted expenditures for 1957, $71,598, plus $7,500 for a Washington office or a grand total of $79,098.

About 60 per cent of this sum is raised by assessements on the member societies and the balance from various sources. In other words, if you are a member of one of the constituent societies of Engineers Joint Council, part of your dues to your society are used to support the EJC activities. ASCE is the major contributor followed by ASME, AIEE and AIME and the others in lesser amounts.

Board Action: Report Received

ETHICAL PRACTICES

This is a progress report on activities of the Ethical Practices Committee since the meeting of the Board of Directors in White Sulphur Springs on October 25-26, 1956.

The unfinished business received by this Committee is still receiving attention. The numbers refer to the items in our October, 1956, report.

1. Some thought has been given to the subject of uniform telephone listings. After further consideration by the Committee, the thoughts will be discussed with representatives of A.T. & T.
2. Engineering Advertising and Free Engineering Services have been covered by statements of policy which were adopted by the Board in June, 1955, and June, 1952, respectively. There is little more this Committee can do than to give opinions on specific cases that are referred to the Committee. Most of the cases arising under these headings can be most effectively handled by state society or chapter organizations.

   One case in connection with advertising was referred to the Committee and an opinion has been given.
3. A statement of policy on the Employment of Engineers by Contract was adopted by the Board in June, 1952. Possible clarification of this policy is on the agenda for consideration by the Committee. This is also a subject that is handled best locally. The national organization can recommend procedures. Enforcement is a local problem.
4. It is proving to be very difficult to secure authors for articles on ethics to be used as part of the Education on Ethics activity. Perhaps each national director can arouse some interest in this effort in his state society.
5. The Procedures for Handling Violations of Ethics which were approved in May, 1956, will be critically reviewed prior to their distribution to the state society and chapter organizations.
6. The copies of the draft of the Brochure on Ethics which were distributed to ECPD and its constituent societies resulted in a great deal of discussion. The copies that were sent to the state societies brought in a number of comments and suggestions.

Task Force #3 of the Consultants' Functional Section has conducted a survey of the state societies regarding standards of ethical practices used; enforcement of ethical practices; control of malpractices; and measures of discipline and enforcement. Their report is not yet ready for publication.

The chairman of the Ethical Practices Committee was one of three speakers at a session on Ethics at the winter meeting of AIEE in New York. His subject was "The NSPE Program in the Field of Professional Ethics." About sixty people attended this session which ran concurrently with eleven sessions on other subjects.

RECOMMENDATIONS

(1) Since A. T. & T. seems irrevocably opposed to the type of classified telephone listings approved by the Board several years ago, the Committee requests approval to discuss this subject further with A. T. & T. with the thought of developing a mutually satisfactory arrangement of listings.

(2) The preparation of sheets on "Ethics and Practice Committee Procedures" for inclusion in the Chapter Handbooks.

(3) To correct the lack of planned overlap, the appointing of Committee members for three year terms with two new members to be appointed each year.

(4) The provision of a binder containing factual background information for each Committee member with the provision that the binder of each retiring member be forwarded to his successor.

Board Action: Recommendations Approved

MEMBERSHIP COMMITTEE

GENERAL

In its report at the October, 1956, meeting of the Board of Directors, the Membership Committee spoke of making the year 1956-57 a "Year of Achievement" in growth of membership in our Society. We stated our belief that a well-organized and enthusiastic program at all levels could easily double the annual rate of addition of new members. Your Membership Committee still firmly believes that this goal can be accomplished, and we take this opportunity to report progress.

WHAT HAS BEEN ACCOMPLISHED TO DATE?

During the year 1956, NSPE experienced a net increase in membership of 3,129, a growth of over nine per cent; this compares with the growth during the year 1955 of 2,296 or 6.7 per cent. For the six months ending December 31, 1956, the net gain in membership was 2,837, compared with a similar figure in the last six months of 1955 of 2,101. It is encouraging to note that during the past six months fifteen state societies have reported membership increases of more than ten per cent, five state societies more than twenty per cent, and the two newest state society affiliates, Iowa and Mississippi, have more than doubled their membership. The rate of growth of membership in the last quarter in 1956 was the greatest in the history of our Society.

FURTHER GROWTH IN 1957?

If the rate of growth during the last quarter of 1956 were to continue through the first half of 1957, our Society would come very close to realizing the increase of 5,700 members in 1956-57 which President Rhinehart indicated last fall would be required to permit the Society to carry out all phases of its vital program. If this goal is to be accomplished, however, it will be necessary for the present excellent promotion work to continue, and equally important, it will be necessary for us to minimize the number of members dropped from our rolls on June 30, 1957, due to delinquency.

WHAT ABOUT DELINQUENCY?

During 1956, NSPE lost about 1,000 members due to their having been delinquent in payment of 1955 dues. Currently some 3,034 of our members (almost ten per cent) are in arrears for 1956 dues. Although this is slightly better than a similar figure at the end of 1955, your Membership Committee feels that a most vital factor in making the current membership campaign successful will be a vigorous effort on the part of state societies and local chapters to insure that members in arrears be brought back into good standing before midyear. This will not just happen; it will require effort of all officers in every state society and local chapter. There are many techniques which have been used in the past to combat this problem. Probably the most effective of these is a personal contact by leaders in the local chapter to determine the reason for the reduced interest on the part of such individuals. This technique should, of course, be encouraged, and it may be supplemented by friendly letters, perhaps in a humorous vein, by the president or treasurer of the local chapter, possibly suggesting that the individual may have overlooked payment of his dues.

PROGRESS ON THE SIX-STATE MAILING CAMPAIGN

The mailing campaign from the Washington headquarters has been completed. To date, it has resulted in 196 applications for membership. While this result is not as encouraging as some of us had hoped, it is likely that the over-all gain may be much higher as a result of personal contact with nonmember engineers by local chapter membership promoters. On balance, it is the opinion of the Membership Committee that the mailing program has been moderately successful, and that it should be continued during the year 1957-58. Provision has been made for such a continuation of the program in the budget, and the Membership Committee will start making plans at once to implement the plan.

CONTESTS

There has been some question as to effect of the mailing campaign on the results of our national contests for membership growth. Your Membership Committee considered this problem in detail and came to the conclusion that although the mailing program would undoubtedly lend some advantage to the participating states, it was not felt that the formula should be adjusted to the detriment of these states. Our reasoning was that a well-organized, vigorous program could easily offset any such advantage. It is interesting to note in this connection, that none of the six states which participated in the mailing campaign is leading in the contests in their area as of the end of December.

CONCLUSION

Needless to say your Membership Committee is pleased with the progress of our membership campaign thus far. We urge that there be no let down in effort at either state or local chapter level. For the next few months, it is strongly suggested that emphasis be placed on a program for keeping the members we already have, avoiding a discouraging loss due to delinquency. If we can do these two things, the Membership Committee is confident that 1956-57 will indeed be a "Year of Achievement" in membership growth.

YOUNG ENGINEERS

The action program for young engineers which was approved by the Board of Directors last year continues to move forward. It will be recalled that this action program now has three main objectives:

1. Establish November as Young Engineers Month.
2. Promote the organization of young engineers in the chapters.
3. Assist state societies in the formation of student chapters at colleges and universities.

The Young Engineers Month program, November, 1956, worked out much better than we might have expected. The questionnaire for surveying the interest in Young Engineers Month which was authorized by the Board of Directors was sent out and a good many returns have been received.

Over half of the 121 returns received state that special attention was given to Young Engineers Month in 1956. Considering the small amount of time available for preparation, it is encouraging indeed that so many were interested in doing something to create interest in the young engineers.

The answers received in the questionnaire indicate that many different kinds of activities were tried by the different chapters and a great majority were satisfied with the results. It appears from the questionnaires received so far that the most popular form of special activities for Young Engineers Month are as follows:

1. Invite young engineers to the November meeting as special guests of the chapter. Frequently, a chapter member is assigned to each young engineer as a sponsor.
2. The subject of the meeting is related to the young engineer and his career.
3. Young engineers participate in the program. In a number of successful meetings, young engineers formed panels, sometimes with a second panel of more experienced engineers for discussing subjects of special interest to the young engineers.
4. Special recognition to newly licensed engineers. In a number of cases, a state board member was present and presented new registrants with their certificates at the meeting.
5. Students and sometimes faculty members from engineering colleges and universities were invited as special guests of the chapter.
6. In some cases, high school students interested in engineering and science were invited as special guests and some chapters invited high school teachers.

The most important and the most encouraging information obtained from the questionnaire is that 107 of the chapters, or about eighty-five per cent of those reporting thus far, state that they expect to give special attention to Young Engineers Month in 1957. Only five chapters indicate that they will not. Some of the chapters find it advantageous to use some month other than November because of a special kind of program or because of their past experience. The great majority, however, expect to use November.

The work on the Young Engineers Month Kit for use in 1957 has already begun and every effort will be made to have this in the hands of the state societies and the chapters in plenty of time to permit proper planning for November, 1957, as Young Engineers Month. The Kit will be quite simple, much less elaborate than the Kit supplied for Engineers Week, but it will include the ideas from the many chapters that have developed successful programs and should assist all of the chapters in planning a more effective Young Engineers Month program next fall.

The second objective of the action program approved by the Board last year is to promote the organization of young engineers in the chapters.

It is evident from the information which we have received from a number of chapters that this program is slow in getting started. It is encouraging, however, that a few chapters are already undertaking the organization of young engineers. One chapter reports that their young engineer group is meeting every month and that they are carrying on some very good projects. Other chapters have noted that they are making every effort to have young engineers take a more active part in the regular chapter activities. Both of these methods of obtaining young engineer interest should be effective and every chapter should be trying either one or both of them. The action program that has been approved suggests that we try both of these and continue to make use of whatever appears to be effective.

The replies from the Young Engineers Month Questionnaire indicate that some of our members are concerned about the possibility of the young engineers organizing outside of the chapter organizations. It is important that all of our members understand that the organization of young engineers as approved by the Board requires that they are an integral part of the chapter organization. They should be brought into every regular chapter activity. They should be appointed on committees, elected as directors, and given an opportunity to serve as officers.

To help in explaining this plan to the chapters, work will be started shortly in the preparation of the Young Engineers Handbook which was approved at the last Director's meeting. It is interesting that one State Society (Michigan) has already written us requesting the Handbook and stating that they wish to go ahead with a State handbook for young engineers. We encourage them and any other state society to go right ahead with whatever information they feel their chapters need in helping organize young engineers. We should be very appreciative if each state society working on such a project would send us copies of information which they compile so that we can use it in the preparation of the Young Engineers Handbook for the National Society.

The third objective on the action program approved by this Board of Directors is the plan for student chapters of state societies to be recognized by the National Society. As directed by the Board at the last meeting, a special subcommittee was appointed by President Rhinehart to fully develop these plans. An excellent committee of people experienced in various phases of this work was appointed under the able chairmanship of Professor Neils Thompson. It is important for us to note that the interest that has been building up on this subject of student chapters is amazing. This intense interest should be indicative of the recognized importance which this activity has to the future of our Society.

Board Action: Report Received

STUDENT CHAPTER SUBCOMMITTEE OF THE YOUNG ENGINEERS COMMITTEE

INTRODUCTION

The Board of Directors at its meeting on October 26, 1956, authorized the appointment of a special Subcommittee of the Young Engineers Committee to draft and submit to the next Board of Directors meeting:

a. Minimum requirements for student chapters.
b. Student Chapter Manual outline.
c. Student member requirements, privileges and dues.
d. Student Chapter leaflet outline.

The Subcommittee was appointed in December of 1956 and has started its work on these four tasks. It is not possible, as of this date, to make recommendations on any of these assignments. Considerable material has been collected and a number of members of NSPE have written in regard to the over-all problem of student chapters.

MINIMUM REQUIREMENTS FOR STUDENT CHAPTERS

It is apparent that in establishing a minimum requirement for student chapters that this is influenced by the nature, wording and philosophy that will be finally established for the student member requirements, privileges and dues. Therefore, this will not be considered until some plan has been evolved for the relation of the student member to NSPE.

STUDENT CHAPTER MANUAL OUTLINE

The Subcommittee is studying the outlines of student chapter manuals of the Ohio Society for Professional Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers and the American Institute of Electrical Engineers. By using the manual of OSPE as a base and by taking the good features of the other manuals, it is believed that it will be possible to secure a suggested outline for recommendation to the Board of Directors.

STUDENT MEMBER REQUIREMENTS, PRIVILEGES AND DUES

President Rhinehart, Vice President Dyer and Professor Hobson have had considerable correspondence on this problem. The Subcommittee is considering the suggestions that have been made and it is anticipated that oral discussion will be necessary with the members of the Board before final recommendations can be made on the requirements, privileges and dues of the student member.

STUDENT CHAPTER LEAFLET OUTLINE

The nature of this leaflet will depend upon the solution of problems in the other assignments and, therefore, the development of an outline must await the final formulaton of other recommendations.

Board Action: Report Received

RESOLUTIONS

Your Committee has the following three resolutions to present:

RESOLUTION 14-56

(Submitted by Michigan Society of Professional Engineers.)

State Society Membership for Professional Engineers Registered in Canada Residing in U.S. At the fall meeting at White Sulphur Springs, the Board referred this resolution back to the Resolutions Committee for further study and action.

This Board has already extended the "hands across the border" intent by Action 56-42 extending to registered Canadians the privilege of applying for NSPE membership-at-large. Since this act is subject to membership confirmation, voting which will take place shortly, your Committee feels that, while they have no doubt that the membership will sustain the Board's action, it would be appropriate that action on 14-56 be taken by this Board at the next annual meeting in Dallas.

RESOLUTION 1-57

(Submitted by Engineering Preparation Committee)

WHEREAS, the President of the United States has established a National Committee for the Development of Scientists and Engineers; and

WHEREAS, this Committee is working along several avenues of approach to improve the teaching of mathematics, science and engineering in our schools and colleges, to provide for a more effective utilization of scientists and engineers in industry and in the armed services, to develop programs which would relieve the shortages of facilities in our engineering and science institutions, to provide for the training of larger number of technicians as aids to engineers, to develop educational films to interest, to motivate and to guide young people who have the necessary aptitudes for successful careers in science and engineering, and

WHEREAS, the National Society of Professional Engineers, within the framework of its policies, has for several years been engaged in educational activities, many of which tend to supplement and support the objectives of the President's Committee.

NOW, THEREFORE, BE IT RESOLVED, that the National Society of Professional Engineers stands ready to assist the President's Committee through its national, state and local organizations, and

BE IT FURTHER RESOLVED, that this offer of assistance be communicated to the chairman of the President's Committee with the request that a liaison be established between the Committee and our Society's headquarters in Washington so that we may be able to determine jointly the areas in which our co-operation would be most effective.

RESOLUTION 2-57

(Submitted by Engineering Preparation Committee)

WHEREAS, The American Association for the Advancement of Science has inaugurated a Science Teaching Improvement Program, some of the purposes of which are the improvement of the salaries and professional status of grade school and high school teachers in mathematics and science, motivation of capable students to study mathematics and science, and other activities designed to bring about an improvement in the teaching of mathematics and sciences in grade schools and secondary schools, and

WHEREAS, the National Society of Professional Engineers, within the framework of its policies, has for several years been engaged in educational activities many of which tend to support and complement the objectives of the Science Teaching Improvement Program.

NOW, THEREFORE, BE IT RESOLVED, that the National Society of Professional Engineers stands ready to assist the promotion of this Program through its national, state and local organizations.

Board Action: Resolutions Adopted

N.S.P.E.

Believes

THE ROLE OF THE LOCAL CHAPTER

BY PAUL H. ROBBINS, P.E.

Executive Director

N.S.P.E.

PROBABLY most members of the professional Society have their greatest contact with the organization through the local chapter. Although the three levels of the society function well, the state society and the national organization are not as close to the individual member as the chapter. That this is true is a part of the fundamental belief of NSPE.

Professional development of engineering can be only as effective as these activities and results accrue to the individual engineer. This is why NSPE is based on individual membership; why the national organization is administratively divided into these three levels of effective action; why each level is autonomous to provide direct control of policy and programs by those affected; why democratic government is established whereby each higher level is governed by representatives chosen at the lower levels; why NSPE has established the legal recognition of qualification to practice as the basis of membership.

NSPE has always believed that all its programs and activities should be aimed to add to the dignity, prestige, and welfare of each engineer and thereby the profession as a whole.

Since the direct participation of every member is possible at the chapter level, it is here that extensive responsibility for the development of the NSPE program rests. As a result, this responsibility falls on many shoulders. It falls on the shoulders of each member in the form of participation and attendance at chapter meetings. Since there is need for organization and simultaneous action on several activities at the same time, it is natural to have committees to concentrate on a limited area. To serve on such committees is an opportunity to further the development of a facet of the broad professional program. These committees need chairmen who will spearhead committee consideration of the areas assigned. Boards of Directors coordinate committee activities, and officers direct the expeditious implementation of committee recommendations and action.

The backs on a football team do not get far if the line fails to block. Chapter programs and activities bog down if officers, committee chairmen, or members fall down on responsibilities assigned. When this occurs, not only the chapter suffers but the professional development and prestige which will accrue to each member fails to be realized. Often when approached, a potential member will pose the question, "What will the Society do for me?" If he stops to think about it, the Society he refers to is actually 40,000 other professional engineers like himself. What he really means is "What will you fellows do for me?" Obviously nothing would ever get done to advance the profession if each of the other members was unwilling to do anything for the good of the *profession*.

Of course, the same considerations are true at the state and national levels. Much is in evidence of what has been done and is being done. These activities will be of far more extensive value to each individual engineer to the degree that they are implemented at the chapter level. Almost without exception, all the national and state activities need to be directly implemented locally.

Several obvious activities are successful because of widespread local activity. Engineers' Week last month was the success it was because of local implementation. Each engineer undoubtedly took pride in the recognition given engineers on the nationwide TV shows such as G. E. Theater and Ed Sullivan; but it was the local publicity on radio, television, in the home-town newspaper and before the civic clubs that made each engineer's friends and neighbors aware of the contributions of the profession of which he is a part.

The most effective activity possible in improving science and mathematics teaching in our high schools and acquainting young people with engineering opportunities, is that which is carried on in local areas. Here chapters are really in the front lines of a major national problem.

Of more direct concern to individual members is the extensive field of employment practices. Here the studies of the Professional Engineers Conference Board for Industry; the publications, *The Professional Look at the Engineer in Industry and The Criteria For Professional Employment*, all provide numerous examples of areas where local chapters can work with users of engineering services.

NSPE believes the local chapter has a role to fill which is the bedrock upon which professional development can be built. The success with which the objective will be obtained depends in turn on each member's willingness to assume his fair share of the burden. Let the increase in the professional status of engineering never falter because of the unwillingness of members of the profession to do their bit in local chapter activities.

—*End.*

With Our Members . . .

Officers Installed In May

Pennsylvania Society Moves Into New Headquarters In Harrisburg

The Pennsylvania SPE has completed arrangements for the purchase of a home for the society headquarters and recently moved to their new location. According to Secretary John West, the new location is out of the central business district in an area where parking will not be difficult and where the Society will have room for expansion which was not possible in their previous crowded, rented quarters.

The Pennsylvania Society, founded in 1934, was one of those which helped form the National Society and it has grown from ten members in one chapter to 1000 members in twenty-nine chapters. President L. F. Tierney recently appointed a special committee consisting of Past Presidents Ritchie Lawrie, Jr., and J. D. Carpenter with Treasurer J. W. Magoun to look into the question of housing and after some studies involving a number of properties the committee recommended the purchase of property at 2121 N. Second St., Harrisburg.

The recommendations were accepted by the Executive Board. The quarters are in one-half of a twin dwelling and while there is more room than the Society requires at present, consideration will be given to possible rental of some space. The Society expects to be able to pay for the property largely from funds raised from donations by individual members.

At a recent meeting of its executive board, the Pennsylvania Society accepted a report of its nominating committee for the following officers to take office at its annual meeting in May: president, H. M. Nelson, Erie; vice presidents, F. W. A. Myers, Philadelphia; Marlin E. Wilt, Williamsport; Edward L. Dryer, Lancaster; Marcel M. Fertig, Pittsburgh, and Glenn Shorts, Erie. L. F. Tierney was nominated for a three-year term as national director, and John W. Magoun and John T. West, Jr., were renominated as treasurer and secretary.

Mr. Nelson was one of the founders of the Erie Chapter, has served as chapter president and state director and for the past year has been vice president of the State Society. He is senior member of the engineering-architectural firm of Nelson, Goldberg and Heidt in Erie.

Nuclear Bomb Protection Discussed At D. C. Meet

Oscar Sudermeister, professional city planning consultant, told the District of Columbia SPE at a recent meeting that deep shelters are the only reasonable protection for city people from atomic and hydrogen bombs. He pointed out that nuclear bombs are cheaper than TNT for all-out warfare and, therefore, protection from such bombs must sooner or later be considered.

Mr. Sudermeister recommended a minimum of three feet of earth for protection against radiation and sufficient blast resistance to withstand thirty psi. He favored underground shelters tunneled into solid rock located at strategic highway interchanges scattered throughout a populated area.

Tom C. Halsey, right, is shown receiving a certificate of commendation for excellent service to the Bexar Chapter, Texas SPE, during his term as president of the Chapter. John J. Koy, new president, made the presentation.

Nassau County Chapter Installs New Officers

The officers and directors of the Nassau County Chapter, New York State SPE, were installed at the second annual January installation party in Mineola, N. Y. The installing officer was Dr. Mario Salvadori, professor of engineering at Columbia University.

Officers installed were: A. Sol Uman, president; Emmett Bowker, vice president; John Gregg, secretary; Clyde Alston, financial secretary; Anthony Giardina, treasurer, and John Alicandri, Joseph Stein, Francis Welch, and Lawrence Larkin, directors.

West Virginia Chapter Officers

New officers and the retiring president of the Appalachian Chapter of the West Virginia SPE are shown at the annual ladies night meeting held in Berkley. They are, l. to r.: Mrs. Lloyd G. Fitzgerald; Mr. Fitzgerald, outgoing president; Mrs. A. L. Walker; Mr. Walker, new president; Mrs. Felix Fisher; Mr. Fisher, vice president; Mrs. Cecil Graham, and Mr. Graham, secretary-treasurer.

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By Mrs. Warner Howe, Chairman of the Ladies Auxiliaries Advisory Committee.

THE WIVES OF ENGINEERS graduating from Texas Technological College, who were entertained on the evening of February 14 by the wives of Engineers Auxiliary of the Lubbock Chapter, Texas SPE, enjoyed a talk by Mrs. L. H. Kirby on the purpose and activities of the Lubbock Auxiliary and also a musical program presented by Mrs. H. J. Pijan, vocal soloist; Francisco Hernamdy, violinist; Mrs. E. D. Clements, accompanist, and John Gilbert, pianist. In honor of Valentine's Day a centerpiece of hearts, cupids, and red carnations was arranged on the refreshment table which was covered with white net over white satin. A silver punch bowl and tea service completed the effect. Hostesses were Mrs. A. C. Bowden, chairman, Mrs. Leslie Irving, Mrs. Robert Rapier, Mrs. R. B. Egger, Mrs. G. P. Green, and Mrs. E. B. Tullos, president of the Auxiliary. This Auxiliary tries to contact and welcome all engineers' wives who move to Lubbock.

MRS. HANEN H. WILLIAMS, president of the Ladies Auxiliary to Central Arizona Chapter ASPE, mentioned a simple-to-do project in her letter: during the first year of the auxiliary's existence they provided some new and used clothing for the Maricopa County Juvenile Detention Home. An advisor from the Detention home was a speaker at one of the Auxiliary's meetings. They now have a much more ambitious project which will be described in the 1957 *Engineers' Wives*.

MRS. CHARLES DAY, president of the Women's Auxiliary to the Beaver County Chapter of the Pennsylvania SPE, expressed in her report a desire to know how many of the auxiliaries hold meetings monthly. The answer is that nearly all auxiliaries meet once a month except during the summer months, and many have family picnics during these months. (December is the month of dinner parties entertaining the husbands.) One of the primary values of regular monthly meetings (same day and time) is that members form the habit of attending their auxiliary on the specified day, and by reserving the same day each month for the auxiliary meeting they are better able to avoid conflicting engagements.

AN INTERESTING IDEA FOR the auxiliaries and the PE chapters comes from Mrs. C. H. Wilson, past-president of the Ladies Auxiliary of the Rockford Chapter of the Illinois SPE. "Our membership chairman is the wife of the membership chairman of the PE Chapter. She finds that having both lists in their home and the membership work carried on from their home is a great help for both groups." She adds, "It has helped to have old members contact prospective and new members for rides to our meetings."

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Texas Society Appoints G. F. White Ex. Director

The board of directors of the Texas SPE has appointed Gus F. White, of Austin, as executive secretary of the Society with headquarters in the Nash Building, Austin.

Mr. White, a native of Paris, Texas, comes to TSPE with an extensive background in organizational work.

Form Potomac Chapter Of Maryland Society

Engineers from Prince Georges and Montgomery counties in Maryland recently established a Potomac Chapter of the Maryland SPE. Frank Winslow, State president, presented a charter to the group.

Officers of the new Chapter are: Victor J. Richter, president; Page Hopkins, first vice president; Max Morris, second vice president; Eric Small, secretary, and Alden Imus, treasurer. Elected to the board of directors were L. W. Codwallder, Edward Scullen, Russell Allen, Samuel Neely, Robert E. Morris, and Mason Butcher.

The Twenty-first annual meeting of the Texas SPE was held recently in San Antonio. This photo shows four men who took an active part in the event. They are, l. to r.: J. John Koy, president of the Bexar Chapter, TSPE; Mason G. Lockwood, past TSPE president; Robert L. Schmidt, State director, Travis Chapter, TSPE; and Garvin H. Dyer, NSPE vice president.

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STRICTLY BUSINESS

Personalities . . . Harold S. Stickel has been appointed executive vice president of **Crump, Inc.**, engineers and contractors, of Pittsburgh, Pa. . . . Appointments of **Thomas J. Gillick, Jr.**, as manager of the Engineering and Research Division of **American Felt Company** and of **Harold G. Hencken** to succeed **Gillick** as the company's director of engineering activities have been announced. . . . **Lester E. Jordan** has been named district engineer in charge of the **Portland Cement Association's** Philadelphia office. . . . **Robert H. Barclay,** former vice president-engineering of the **J. G. White Engineering Corporation,** is now practicing independently as a consulting engineer at 80 Broad Street, New York, N. Y. . . . **H. J. Buttner** has been appointed chief engineer of **McCullough Motors Corporation,** Los Angeles, Calif., according to **Sherwood Egbert,** executive vice president. . . . **Elmer A. Beck, Jr.,** has been promoted to the position of executive engineer by **Cook Research Laboratories,** a division of **Cook Electric Company,** Chicago, Ill. . . . The appointment of **Wilton E. Parker** as assistant chief engineer for **The Garrett Corporation's** AiResearch Industrial Division. . . . **Ernest W. Neben** has assumed the title of director of central engineering for **The Pfaudler Company,** Rochester, N. Y., and **Joseph M. Culotta** has been named chief project engineer of the company.

Harold S. Stickel

Promotion of **Elmer Olson** to the newly created position of director of engineering and sales at the Rochester, N. Y., Products Division of **General Motors** has been announced by **Wallace E. Wilson,** general manager. . . . **Claude E. Skidmore** has been named district engineer for Michigan and northern Indiana, it has been recently announced by **J. E. Buchanan,** president of **The Asphalt Institute.** . . . **William S. Gleeson** has been appointed real estate manager of **American Machine & Foundry Company,** New York, N. Y. . . . **Nathan Feder** has been appointed to the staff of **Radar and Associates,** engineers and architects, of Miami, Fla. . . . The advancement of **William N. Pauley** to partner in the firm of **H. E. Bovay, Jr.,** consulting engineers, has been announced. . . . **Robert L. Deatherage** recently began work as a junior design engineer in the research division of the **Maytag Company,** Newton, Iowa. . . . **Allison K. Simons** has been appointed director of engineering and research for the **Bostrom Manufacturing Company,** Milwaukee, Wis., according to an announcement by **Harold W. Bostrom,** president. . . . **Republic Aviation Corporation,** Farmingdale, N. Y., has announced the appointment of **C. E. Pappas** as assistant director of scientific research. . . . **C. D. Haxby,** vice president of **The Rust Engineering Company,** Pittsburgh, Pa., has been elected president of the National Constructors Association.

Wm. S. Gleeson

In a recent announcement, **J. A. O'Grady,** president of **Weldaloy Products Company,** Van Dyke (Detroit), Mich., reported the addition of **Orville E. Heldt** to the firm's engineering department. . . . **Charles H. Zweifel** has been appointed chief engineer of the **Pacific Coast Engineering Company,** Alameda, Calif. . . . **Claude L. Huey** has been named manager of the **Babcock & Wilson Company's** Atlanta District. . . . Appointment of **Joseph J. Jerger** to the new post of director of engineering at **National Water Lift Company,** a division of the **Cleveland Pneumatic Company,** Kalamazoo, Mich., has been announced by company officials. . . . The promotion of **Michael A. Spronck** as editor of **Construction Equipment** magazine has been announced. . . . **David H. Brown,** president of **New Process Gear Corporation,** Syracuse, N. Y., has announced the appointment of **Thurman O. Reuttinger** as chief engineer. . . . **George L. Curtis** recently became systems planning engineer in the Palo Alto research and development facility of **Federal Telecommunication Laboratories,** a division of **International Telephone and Telegraph Company.** . . . **Graver Water Conditioning Company,** New York, N. Y., has announced the appointment of **Vincent J. Calise** as general sales manager. . . . **J. F. Huitt** has been named chief engineer of the **Flori-Houston** pipe fabrication combine in St. Louis, Mo. . . . **Arthur R. Tobias** has been appointed to the post of engineer in charge of the mechanical test room of **The Garlock Packing Company,** Palmyra, N. Y. . . . **J. M. Wilke,** vice president in charge of sales for **Laclede Steel Company,** St. Louis, Mo., has announced the appointment of **August H. Lamack** to the position of assistant district manager of construction products sales. . . . **Lynn Chapman** has been transferred from the **Hyster Company's** Portland (Ore.) factory to the position of supervising methods engineer at the Danville, Ill., factory. . . . **Recony Corporation,** New York, N. Y., has named **Donald D. Stover** as chief development engineer.

Claude L. Huey

New Officers . . . Herbert T. Florence, executive vice president, **Cleveland Crane and Engineering Company,** Cleveland, Ohio, was elected president of the **Electric Overhead Crane Institute, Inc.,** at its annual meeting. Other officers elected were: vice president, **Frank M. Blum, Harnischfeger Corporation,** and directors, **Arland R. Walkley, Manning, Maxwell & Moore, Inc., William H. Morgan, Morgan Engineering Company,** and **William W. Peattie, Northern Engineering Works.**

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NSPE Conference Slated March 7-9

The NSPE State Presidents' and Secretaries' Conference will be held March 7-9 at the Memorial Union, Purdue University, Lafayette, Ind.

The purpose of the conference is threefold: (1) To permit an exchange of state society administrative experiences; (2) To better acquaint state presidents and secretaries with professional society philosophy and programs, and (3) To provide state presidents and secretaries an opportunity to pose questions arising in the state societies on which other states may have had experience.

The program will be oriented primarily toward the state's responsibility to develop and encourage programs at the chapter level.

Legal

(*Continued from page 23*)

"* * * the legislature may, without denial of equal protection of the laws, classify businesses and occupations for purposes of regulation, provide different rules for different classes, limit a regulation to a particular kind of business, extend to some persons privileges denied to others, or impose restrictions on some but not on others, where the classification or discrimination is based on real differences in the subject matter and is reasonable, and the legislation affects alike all persons pursuing the same business under the same conditions."

The Court continued by saying: "And the discretion of the legislature in making these classifications is great, and is not lightly to be interfered with by the Court."

The Wisconsin Society of Professional Engineers, through its attorneys, participated in the case by preparation of briefs and presentation of arguments to the Court.

Surveyors' Duties

The Virginia Registration Board has ruled that the designing of road and street grades or gradients and storm water drainage systems by certified land surveyors was beyond the scope of the practice of land surveying and constituted the practice of highway engineering, which is a branch of civil engineering.

It was brought to the attention of the Virginia Board that certified land surveyors were submitting to local building inspectors plans including the design of road and street grades and drainage systems. The Board was asked for a formal ruling to determine if the foregoing activities were within the scope of the practice of a land surveyor. The Board ruled that such activities were not, and in effect constituted the practice of highway engineering. Subsequently the Board was asked by a group of land surveyors for a public hearing so that they could air their views. A hearing was held and as a result the Board appointed a committee to recommend a solution to the problem created by the Board's ruling.

The report declared that the committee "respects the integrity of the three professions [architecture, engineering, and land surveying] to practice within the law . . ." The report concluded by stating: "Therefore, the Committee recommends that no further action be taken on the matter before the Board . . ."

The Board has advised each registered land surveyor in Virginia to confine his practice to the limitations set forth under Virginia law which declares: "'Land surveying' refers only to surveys for the reestablishment of land boundaries and the subdivision of land and such topographic work as may be incident thereto, the making of plats and maps and the preparing of descriptions of the lands so surveyed or investigated."

Haynes

(*Continued from page 28*)

the courts and justice departments carefully scrutinizing "Patent Pools" to see if any antitrust laws were being violated. Whether or not the pendulum has swung a bit too far is debatable. Perhaps this former misuse of patents has caused the antitrust backers to be a bit too tough on patent agreements and licenses in general.

Somewhere between the extremes of defensive patents and progressive patents management must use its patents to the best financial advantage.

There is no hard fast rule which can be established in advance. It is necessary to determine a general policy or goal and then treat each patent situation as it arises in the light of this general policy.

A general patent policy which will guide the determination of each patent situation as it arises may be summed up as follows:

The patent policy of the company is to:

1. Keep an open market for its products;
2. Protect the company against unnecessary legal expenses;
3. Promote inventiveness through patent recognition of the inventor's success;
4. Permit only limited competition on new basic products until the company is able to train for competition; and
5. Use patents to prevent all out competition until research or product development has been paid for.

This type of foresighted patent policy on the part of management will gain prestige among customers, stockholders, the public and competitors for the company.

New profitable products will be uncovered and made a part of the company's growth—***End.***

Rickover

(*Continued from page 16*)

to continue the high scholastic standards set under private management.

These model schools would demonstrate what could be accomplished by competent teachers, a proper curriculum, and an adequate school year. They would be goals and living examples of what can be done by the community for the education of its children.

These are my suggestions. Others can and will be made. But let us make a start. We have the ability to do this. We are rich enough to do this. All we need is the will to do it and to recognize that "the inevitable comes to pass through effort." **End.**

About the Author . . .

Adm. Rickover

Rear Admiral H. G. Rickover graduated from the U. S. Naval Academy in 1922, and received a Master of Science degree in electrical engineering from Columbia University in 1929. He qualified as a submariner in 1930, and was assigned to the atomic submarine project with the Atomic Energy Commission in Oak Ridge, Tennessee, in 1946. Since then he has become widely known as the leading figure behind the Navy's atomic submarine program. He is currently chief of the Naval Reactors Branch, Division of Reactor Development, U. S. Atomic Energy Commission; and assistant chief of the Bureau of Ships for Nuclear Propulsion. He has had, among other duties, the responsibility for the atomic powered submarines Nautilus and Seawolf, and for the central station nuclear power development at Shippingport, Pennsylvania.

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What's New

This column describes new products of general interest to professional engineers. For further information, circle the item number on opposite page and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

ADJUSTABLE SCALE DRIVER — Item 30

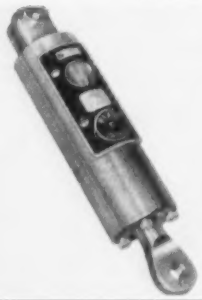
Alvin & Company is now offering a practical aid for all planning and drawing called the Adjustable Scale Drafter. This simple, versatile drafting machine is designed to speed the work of draftsmen, engineers, architects, artists, designers, students, instructors and technicians. Made of durable acrylic plastic, it can be used with a T-square or straight edge.

EAR PROTECTOR GUARDS — Item 31

A radically new "noise barrier" ear protector—smallest, lightest, most flexible of its type—which will enable ground crews to work around jet engine aircraft without danger of hearing loss or ear damage has been developed by the Radio Corporation of America. Resembling a set of ear phones, the RCA ear protector weighs less than 10 ounces and exerts only moderate pressure on the head.

PIAB DYNAMOMETER — Item 32

The Piab Dynamometer is a rugged, compact, portable tension-testing instrument with an accuracy of one per cent. A range of sizes available from 1000 pounds through 80,000 pounds. Large face dial and remote reading attachments also are available. Type "D" 2000 pound unit illustrated is only 2" in diameter.



TEMPLATE-RULER — Item 33

Minnesota Rubber & Casket Company, Minneapolis, has recently issued a template-ruler that permits faster and more accurate drawings of the firm's QUAD RING seal. The ruler will be given to all design engineers whose companies are now using or intend to utilize the new four-lipped ring in various sealing applications. Five available cross sections—.070", .103", .139", .210" and .275"—are cut out of clear styrene plastic to true size and contour.

GALVANIZED OIL CAN — Item 34

A new-style line of completely redesigned galvanized oil and gasoline filler cans for mill, factory, and general industrial use has been introduced by Eagle Manufacturing Co. The cans feature a seamless-drawn dome-shape shell with double-seamed bottom, and no top or side seams. The dome-shape shell prevents water and dirt from settling on top.

AID TO INDUSTRY — Item 35

An effective classroom technique is being adopted by industry to enhance slide or film presentations at sales meetings or employee training lectures. By using black light and fluorescent chalk, explanatory blackboard notes can be made by the lecturer, and read with ease from any part of the darkened room. The darker the room, the more brilliant the fluorescence.

COMPACTING PRESS — Item 36

A new compacting press, advanced in rigid design and engineered for increased versatility through easy application of accessories, has been developed by the Hamilton Division of Baldwin-Lima-Hamilton Corporation. Designed in line with a trend in the powdered-metal fabrication field toward equipment with multiple motions, the latest in the Baldwin line has packaged D-frame construction, promoting steadier, more precise operation.

SIGNAL TIMER — Item 37

A distinctive signal timer (Model 5700) by Tork Time Controls, Inc., will automatically sound time signals or reminders for factories, schools, hospitals, hotels, and at airports or railroad terminals. Signals are sounded at pre-set times, every day, without need for manual attention. Duration of signals can be set for from 5 to 60 seconds.

DRINKING FOUNTAIN — Item 38

A newly designed cantonment type drinking fountain has been introduced by Haws Drinking Faucet Company. This new model 1505 is a departure from previously designed cantonment type fountains, in that it offers smoothly flowing lines that blend with contemporary architecture. The graceful bowl on model 1505 is fashioned in gleaming white vitreous china, and is attached to the wall with a Tenzaloy wall bracket.

ROTO-SCRAPER — Item 39

Roto-Scraper is a newly-developed tool designed to prepare metal surfaces for repainting. It quickly and thoroughly removes paint, mill scale and rust. Roto-Scraper, which weights only 2½ pounds, can be used for all types of metal surfaces as well as for stucco, brick, stone, concrete block, and other masonry surfaces.

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